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# ***JPRS Report***

# **Science & Technology**

***Europe/International  
Economic Competitiveness***

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# Science & Technology

## Europe/International

### Economic Competitiveness

JPRS-EST-93-010

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## SCIENCE & TECHNOLOGY POLICY

### Article Profiles New Research Minister Wissmann

93EN0147A Hamburg *DIE WELT* in German  
28 Jan 93 p 3

[Article by Hans-Werner Loose: "Politics—It's a Little Addictive: The New Research Minister Mathias Wissmann Intends To Take Inventory in His Office"]

[Excerpt] Bonn—In the entrance hall on the 10th floor of the Ministry for Research and Technology in Bonn, the 11 predecessors of Mathias Wissmann are on display in the framed picture gallery. The black and white row of ancestors goes back to Franz Josef Strauss (1955 to 1956 minister of atomic power) and ends with the sole color photo. That shows Heinz Riesenhuber, who after 10 years as minister was ordered back into the ranks by the chancellor.

Matthias Wissmann, 43, unmarried son of a shopkeeper from Zuckerberg in Swabian Ludwigsburg, assiduously performed small and large tasks for two decades in the CDU. Last Friday [22 January] he entered big-time politics: He succeeded Riesenhuber, who, while indisputable as an expert, in the eyes of Helmut Kohl's party no longer appeared to be attractive to the public. "The change," according to the new department chief, who took over the official armored car with driver, "was a dignified event." Three pale red roses stood on his black desk.

As a student at the Schiller Gymnasium [secondary school], Wissman knew where Bartel went to get his cider and breakfast rolls. The outside right of the field hockey national league member of the HC Ludwigsburg became a member of the Junge Union [young supporters of the CDU/CSU (Christian Democratic Union/Christian Social Union)] and contrived a strike by secondary school students against a baker, who twice in a year had increased the price of pretzels by a penny: "We Swabians have a very intimate relationship to numbers and facts."

In 1971 he was elected into the national executive committee of the union recruits, and two years later he was its chairman. When in 1983 he reached the age limit for Junge Union members, he took stock with satisfaction: The number of members during his term of office had almost doubled from 140,000 to 270,000.

His party career proceeded smoothly: 1975, member of the national executive committee of the CDU; 1976, the youngest directly elected Bundestag deputy; 1983, member of the executive committee of the CDU caucus and caucus speaker for economic policy—at the same time, attorney Wissmann secured himself in civilian life against political imponderables.

In 1978 he became a partner in a law firm in his hometown. Now, as minister, he is dropping his participation in the lucrative alliance, as the law commands. In

the 1980s, without the assistance of his partners and without trial, he got through a proceeding of the municipal court in Stuttgart concerning the illegal concealment of election campaign costs, which in 1989 ended with a penalty of a DM [German marks] 180 per diem equivalent for 60 days. "In the matter of party contributions a gray zone existed at that time," he says.

"I rose in defense of my helpers and contributors." But he has no previous record, as lawyer Wissmann knows, "because penalties under 90 days are not entered into the police record."

To the Social Democrats, who now want to reexamine everything, he recommends a look into the biographical "Archiv Munzinger": "There everything can be looked up."

In the political channel, Wissmann, already experienced in his young years, demonstrated both endurance and efficiency. He revolted and went against the grain in this thinking when in 1979 he demanded the regeneration of the CDU and stood up for Albrecht as chancellor candidate instead of Strauss. But he never crossed the party's limits of tolerance. He defines loyalty as "the courage to contradict in personal discussion," for: "One must not express every factual disagreement for everyone to hear."

Wissmann is living proof that to wait is not to hesitate. He refused ministerial posts in the cabinets of Spaeth and Teufel in Baden-Wuerttemberg and turned down Helmut Kohl, who in 1989 wanted Wissman as parliamentary state secretary in the Ministry for Development Assistance. Now he is at the top and says calmly: "Posts hold no interest for me, but objective challenges do indeed."

The smart, at times Swabian-stubborn, grandson of the Union perceives politics "as being, indeed, a little addictive" and agrees with the Social Democrat Fritz Erler: "In politics it is not so important to be right, but to be proved right."

He becomes enthusiastic as he looks out from his ministerial office over Adenauer's Rhoendorf, straightens the subdued tie under the dark blue single-breasted Boss suit and promises restraint instead of revolutionary activism: "I intend to spend the next three to four weeks seriously taking stock. I want to listen, ask, and learn—no quick shooting from the hip."

The key data for the Ministry for Research and Technology are already familiar to him: 776 staff members, of these 44 in the branch office in Berlin; a budget of DM9.6 billion; 10,000 ongoing research projects.

And he knows that there is a need for solutions to two important subjects: the "Transrapid" supertrain, whose

miniature model is displayed under plexiglass on his bookshelf, and the problem of nuclear waste materials.

He finds space travel, so dear to the heart of his predecessor Riesenhuber, "fascinating," but he cherishes ground adhesion. The modification of the law on genetic technology Wissmann intends "to accomplish jointly with the minister for health in the Bundestag and thus avoid obstacles to research."

"Nevertheless," he indicated, "not everything is permitted that is scientifically possible." When asked about the RU 486 abortion pill, the outspoken research minister starts to rack his brain. "This is where my ethical doubts start."

Matthias Wissmann—who as a boy played with an erector set, was "good in biology, decent in chemistry, and rather weak in physics"—describes the good research minister as follows: "He does not have to know every law of physics, but promote and advance the enormous creativity that is present in research and science in Germany."

Wissmann warns against the consequences of a recession. "When the national economy is ailing, everything can be cut off—but not the blood supply to the brain, to science and research." For this reason, he said, the contribution that research policy "must make for industrial location in Germany has priority for me." The new minister knows the old Wissmann clichés. Juergen Moellemann, the glib minister for economics who has resigned, added to the attributes, "professional adolescent" and "monument of a young star," the following: "Kommunikationskind" [communication child].

Wissmann admits that "some of these labels do, indeed, make him angry." [passage omitted]

#### **France: Colloquium on Research Ministry Support for R&D**

*93P60151B Paris 01 INFORMATIQUE in French  
29 Jan 93 p 8*

[Text] Mostly symbolic: this is how the ministry's financial support for research and development may be described. All the same, it is better than nothing. For a few years the Ministry for Research and Space (MRE) has been subsidizing short- and medium-term (three-to-five/seven) research and development projects in which production (supply) industries cooperated with research centers. Last week in Paris, this financial support was the object of the second colloquium on the status of over 80 factory automation and robotics projects initiated in 1980 and 1990.

The ministry's balance sheet showed the following: MRE support, which in 1989 reached Fr24.9 million and then grew to Fr33 million in 1990, decreased in the next two years, first to Fr 21.5 then to Fr16 million. The 1993 figures although not yet available, should be of last year's magnitude. "These financial means were not always

equal to our ambitions," admitted Yves Bouchut, the person responsible for this field in the ministry. He might have added that they have never been. Fortunately, there are other means of public support: it is known that industrial research may find supplementary support from other ministries (defense, industry) or from European organizations (ESPRIT, EUREKA, BRITE/EURAM).

#### **Europe: Pandolfi Proposes Cuts in EC's ESPRIT Program, More Emphasis on Applied Technologies**

*93WS0205B Duesseldorf VDI NACHRICHTEN  
in German 4 Dec 92 p 4*

[Article by Wolfgang Mock: "EC Commissioner Filippo Pandolfi Wants to Streamline EC Support for Information Technology Research—EC Research Looking for New Priorities—ESPRIT Program to be Reduced; More Emphasis on Application Projects"]

[Text] The EC research and development policy is under attack. New perspectives are necessary for information technology support in particular. However, at the upcoming EC summit next week in Edinburgh research is again in danger of becoming the loser in the fight over scarce resources.

Without great illusions, Filippo Pandolfi, the EC commissioner responsible for research and technology policy, is currently preparing for the Council of Ministers negotiations in Edinburgh on 11 and 12 November. The commissioner had asked for an addition to the commission's research budget of ECU1.5 billion (1 ECU = DM 1.96) for 1993 and 1994. However, as Pandolfi pointed out in Brussels last week, this proposal will probably be "drastically reduced."

This has already become a tradition. When the current third general research program which covers the commission's research funds from 1990 to 1994 was passed the original budget plan of the EC commission was reduced from ECU7.7 billion to ECU5.7 billion. It still meant an increase of the commission's research and technology funds from 2.6 percent in the mid-eighties to 4 percent of the total budget today. With these 4 percent out of just short of ECU67 billion (1992), the community has to "create the conditions necessary for the competitiveness of the European industry," as stipulated in the Treaty of Maastricht. The remainder goes into agricultural subsidies (almost 60 percent) and into support for underdeveloped regions (20 percent).

While the Maastricht Treaty emphasized the need for "strengthening the scientific and technological basis of the community," an increase of the research budget to 6 percent of total expenditures as requested by the European Parliament and EC president Jacques Delors is as remote as ever. Moreover, Pandolfi is not one of the political heavyweights in Brussels who could give these demands the necessary force.

Therefore, the only option he has is reorganizing his own budget. According to insiders, one of the first projects to go will probably be the ESPRIT program designed to promote the information technology (IT) industry. Pandolfi does not think much of this program which had been started in 1984 by one of his predecessors. All the more so since according to European Parliament member Bernhard Saelzer, "the original goal of ESPRIT, i.e. sectionalized strategic cooperation among European firms based on joint research projects, has largely failed." Of the total third general research program budget of ECU5.7 billion, the IT industry received ECU1.35 billion (24 percent). However, the comprehensive ESPRIT program with its more than 300 projects always had the problem of "being less than critical in the final analysis" (Saelzer).

In Pandolfi's opinion the program was not sufficiently directed towards industry. He wanted something for which the Europeans had been criticizing the Japanese for many years: targeted projects, i.e. key programs specified by industry.

By now, 22 such "priority technology programs" (PTP), as they are called in Brussels, have been submitted to Pandolfi. These IT programs have been defined by industry.

In contrast to the more than 300 ESPRIT projects of the EC's Third General Research Program where almost 1,700 private companies and more than 700 European research institutions and universities participated, these priority programs in the field of information technology have been developed primarily by the big European industry leaders, first and foremost by Siemens, Bull, Philips and Olivetti.

According to a German industry representative, in doing so Pandolfi is trying "to get projects started which are more relevant to the market," which do not have to go through the lengthy approval procedure, and "which do not necessarily require the participation of several partners at any cost," a condition, which has made the implementation of ESPRIT programs very difficult. "The new priority technology programs were defined by the users with a commercial application in mind."

In addition to software projects, the PTPs also include a project for liquid crystal displays suggested by Philips, projects aimed at using new information technology for production engineering, microelectronics for cars, for circuit design and gallium arsenide technology.

Two additional project proposals refer to the development, construction and utilization of massive parallel ultrahigh-performance computers, an area which in Pandolfi's view deserves special support.

With his new projects, Pandolfi does not seem to restrict himself to the support of pre-competitive research. According to a high official in Brussels, "the market introduction of new products could possibly be supported through the financing of such projects."

However, none of these projects has been passed yet, and the officials in Brussels have not even decided yet what mechanism to use for the appropriation of funds. According to an observer, the small European countries which are represented in the Council of Ministers will simply not tolerate "being pushed aside by the big industry leaders," nor will the Parliament give up its—even though limited—voice in the financing of prototypes.

The summit in Edinburgh on 11-12 December will decide how much leeway Pandolfi will have for his new projects. The EC member countries such as Ireland, Spain, Portugal and Greece demand an increase in the regional fund, while the Northern European countries want to save. And a prime target for savings is the research budget, as stated recently by Host Koehler, undersecretary of state in the Finance Ministry in Bonn.

### France Helping PMIs Automate

93WS0210B Paris L'USINE NOUVELLE in French  
10 Dec 92 p 29

[Article by Juliette Ghiulamila: "Loire Region Automates Its Small and Medium Industries"; first paragraph is L'USINE NOUVELLE introduction]

[Text] Loire country's regional council and DRIRE [Regional Directorate for Industry, Research, and the Environment] have set up a system of technical and financial assistance.

"Since we opted for computer-integrated manufacturing, the company has seen a 30-percent gain in productivity." Fernand Genevier, the CEO of Guemene Confection, has no regrets. Investing 14 million French francs [Fr] to build a new factory, including Fr3 million for CAD-CADM, was quite a gamble for the small manufacturer whose sales will hit Fr80 million this year. Located in Guemene-Penfao (Loire-Atlantic), the company specializes in sportswear and professional clothing for office workers. "We went through a tough year and a half," admits Maxime Mocquant, the company's sales director. "The change was truly revolutionary. But it was worth it." Now that Guemene Confection has sharply increased its share of the French market for work clothes, it expects to double its sales between now and 1995.

No jobs were lost when the company introduced CIM. "However, we did bring back in house work that we had been partially subcontracting," says the sales director. Another change is that the skill level of the firm's 210 employees was upgraded. Many of them had to become computer literate, and this required a huge training effort. The entire production line—from the introduction of raw materials to storage of the finished product—is run by computer.

DRIRE and the region were important players in the firm's metamorphosis. They underwrote Fr500,000 of the investment through the "pilot CIM operations" program that was launched in 1987. "To be selected,

projects must be innovative for the region or industry, capable of being disseminated to other companies, and part of a comprehensive CIM plan," explains Jean-Marcel Morisset, the economic development and research director of the Loire Country Regional Council. The CEOs involved in a project must promise to explain what they did to interested company heads, and even to publish little booklets describing their project.

The state and region have spent Fr4 million a year since 1989 funding CIM investments through plan contracts, which have covered 36 companies in a wide range of industries. An automated production line with continuous quality control was installed at the textile firm Tharreau in Chemille (Maine-et-Loire); the plastic mold company MPO in Averton (Mayenne) set up a new laser-disk manufacturing line; and the agri-food company Jean Routhiau in Saint-Fulgent (Vendee) installed a line to manufacture precooked poultry dishes. Furniture and building trades/public works firms have also benefited.

#### A Call for Annual Projects

There is now a call for financial aid for annual projects. "This program, which is the only one of its kind in France, enables us to select the best operations and assist them with greater sums of money: a maximum of Fr500,000," explains Jean-Michel Berliere, head of the industrial-development division of the Loire Country DRIRE. But assistance is not limited to financial aid.

Experts from the CIM CRITT club for the Loire region and from ADEPA (National Agency for the Development of Industrial CIM) can act as consultants to firms. Besides providing general information, the expert opinions available through the regional CIM programs are offered when the firm is ready to start operating its new equipment—a bonus that can prove invaluable to small industries unaccustomed to the new automation techniques.

#### France: Industrial R&D Policy Outlined

93WS0215A Paris AFP SCIENCES in French  
23 Dec 92 pp 1, 2

[Article: "France: Beregovoy Announces 2 Large Technological Programs"]

[Text] Paris—By announcing the upcoming official launching of two new large technological programs in the electronic components and preparation for "the aircraft of the future" sectors, Pierre Beregovoy, on 17 December, confirmed his decision to pursue government efforts promoting industrial research.

Simultaneously, the prime minister encouraged heads of enterprises "not to give in to pessimism and to roll up their sleeves. I sometimes hear it said that there should be less government and then that government aid needs to be increased. I would like to recall the old saying, 'Heaven helps those who help themselves.' All the same, companies can depend on the government."

While addressing 400 participants at the annual dinner of the National Association for Technological Research [ANRT], the government leader reviewed all the activities undertaken by the government on behalf of industrial research by noting, "the nation's research outlays more than tripled since 1980. That is the strongest advance in the world after Japan."

"With Fr48 billion in tax relief since 1988, corporate tax reformed down to 33 percent and a ceiling on the professional tax (...)," continued the prime minister, "France, with the United States, is at the head of the world class with respect to government-financed research. In 1993 the civilian R&D budget will grow by another 5.3 percent in volume (...). In 1993 industrial research will continue to grow in volume by 1 percent."

Beregovoy announced a three-year renewal of the research-credit tax and reasserted that training was a "government priority": next year the number of research allocations will amount to 3,800.

Noting the scale of the EUREKA programs, increasing cooperation among European companies and the need for synergy among those firms and the community research program, Beregovoy went on to say: "We want a Europe with flexible research and listening to the companies." He also announced simplification of the administrative paperwork burdening foreign researchers invited to government laboratories (getting visas quicker and obtaining residency permits dispensing with temporary work authorization).

Recalling the defense ministry's establishment of the fund for supporting technological cooperation with the International Electrical Engineers Commission [CEI], he also stated: "It is not our desire to promote a brain drain but to lay the foundation for balanced cooperation."

"What we want is a better allocation and better utilization of the resources that the government devotes to research and not necessarily more budget money," declared, in turn, Francis Mer, chairman of the ANRT. Vis-a-vis the United States and Japan "the European Community must have a technological policy. (...) Europe has to exist. Technological expertise has become an indispensable weapon for any strong future strategy, or even for our companies to survive, in an international environment where the competition can only grow worse."

Beregovoy deplored the fact that "research done in our companies is only 1.3 percent compared to 1.9 percent among our competitors (...). German industry's outlays are twice those of French industry in economic sectors not involved in space, electronics and pharmaceutical chemistry."

According to Mer this situation reflects the technological policy conducted for over 30 years in France and which

hardly took so-called traditional industry into consideration. Hence two observations made ANRT's chairman: "First, research needs to be increased among a maximum of companies (...); second, the government needs to re-examine its policy in alleged low and medium technology sectors, where its effort is inadequate, and not allow itself, at the outset, to be influenced by the deceptive terminology, highly characteristic of our Cartesian approach that strives to itemize, rank and prioritize everything, whereas we are increasingly living in a world where everything interacts with everything else."

Mer emphasized that "only Fr6 billion of the Fr53 billion in the civilian R&D budget will be devoted to industry in sectors outside of aerospace and nuclear ones. To be consistent with the country's needs in its competition with its partners, the government should be devoting Fr11 billion to those other industrial sectors."

After acknowledging that National Agency for the Upgrading of Research [ANVAR] procedures, the research-credit tax, etc., are so many useful aids, Mer advocated the decompartmentalization of government research systems including those under the purview of the defense ministry and opening them to the industrial world. "What is important is that research work is useful and is made use of," opined the ANRT chairman, who also in passing hoped to see an even greater shortening of the "cycle running from scientific discovery to marketing of products and procedures." It is necessary to transfer knowledge, reorganize enterprises, so that they derive the greatest benefit. Mer closed by saying that ANRT, which "already manages procedures at the request of the government, is ready to manage others in areas within its purview" to assist companies, since that is its purpose.

**Tasks of New Norwegian Research Council Explained**  
*93WS0220A Oslo AFTENPOSTEN in Norwegian*  
*19 Dec 92 p 14*

[Unattributed article: "Total Responsibility for Norwegian Research"]

[Text] "Norway has ranked low with regard to new industrial products based on research. We must increase the tempo!

"The newly established Norwegian Research Council (NFR) bears a large responsibility for achieving this. We must continue the efforts, reorient ourselves and strengthen cooperation with trade and industry," said Bergen University president Ole Didrik Laerum, M.D., who was recently appointed by the government as the first leader of the new research council's executive committee.

He pointed out that strong commercial policy reasons lay behind the creation of the new council which after 1 January will have total responsibility for all research in Norway and act as an advisory body for the authorities. Among other things this will involve better supervision of Norwegian

research than in the past—and responsibility for taking care of all fields within six interdisciplinary areas.

"But research is far more than new products and NFR will not be concerned solely with industrial development. Among other things the new council will administer Norwegian cultural and social research as well as health research. This involves a big responsibility. Culture will be an important factor in several research fields," Laerum stressed.

He said that one of the most exciting things about the work will be seeing *all* fields in relation to each other. This will be easier than it was before. The five former research councils had an unclear division of responsibility. Sometime this spring all the interconnections will be examined.

"We will start working with great enthusiasm at the beginning of the year," said the man who will set the tone. "The Norwegian Research Council will not have rigid partitions. Both walls and doors will be easy to move!"

But he has a clear awareness that the consolidation of all Norwegian research will also be a complicated matter. "TVI will still require active cooperation and one must be prepared for a dual course in a transitional phase extending until next summer with the five old councils temporarily serving as sections. For example, Norwegian Research Council/General Scientific Research [NAVF] Section."

During the hectic summer months 350 employees will move into offices at Stensberggaten 26 in Oslo. But first nine directors must be in place, most of them from the beginning of the year. And the six research areas will each have between five and seven committee members by 11 January, according to the proposal. The six areas are as follows: industry and energy, bioproduction and processing, the environment and development, medicine and health, culture and society, science and technology.

Other members of the Norwegian Research Council's first executive committee are: Director Marit Reutz, Tromsø (deputy leader), senior executive officer Jan Balstad, Nesodden, director Johan P. Barlindhaug, Tromsø, senior research associate Hans Christian Bugge, Oslo, administrative director Anna-Synnove Bye, Trondheim, professor Kirsti Koch Christensen, Bergen, county commissioner Oddbjørn Nordset, Verdal, professor Signe Kjelstrup Ratkje, Trondheim, and director Ivar Ramberg, Baerum.

**New Research Fields Established at German Universities**

*93WS0230A Frankfurt/Main FRANKFURTER ALLGEMEINE in German*  
*30 Dec 92 p N4*

[Article by F.A.Z.: "Special Research in East and West: Four Out of 12 New Fields in the New States"]

[Text] Twelve new special research fields are to be established at German universities at the beginning of



1993. The German Research Council committee responsible for approving grants has made this decision. Four of these initiatives are to be established in the new federal states. The special research field, "physics and chemistry of optical layers," in Jena will concentrate on photonics, a border area between physics, chemistry, electronics, and technological optics. In the long run this will involve new layers of materials that exhibit non-linear optical effects. The research projects will concentrate on the manufacture, modification, and characterization of layers containing silicon carbide and polymers. Teams working on theory will be closely integrated into the plan for Jena. The new special research field is supposed to carry on the tradition in the field of optics in Jena.

Chemists, biochemists, biologists, biophysicists, and physicists will be participating in the special research field, "organization of lipids and interactions between lipids and proteins in biomembranes and model membranes." It will be developed at the Universities of Jena and Halle. Scientists from the University of Halle as well as from the Institute for Plant Biochemistry in Halle and the Institute for Plant Genetics and Research on Cultivated Plants in Gatersleben want to collaborate in the special research field, "molecular cell biology of plant systems." The establishment of these special research fields is in keeping with an international trend marked by a concentration on the molecular biology of plants, a trend which underlines the importance of the Halle area as a center for plant research.

Physicists at the University of Greifswald will concern themselves with "the kinetics of partially ionized plasmas." Their research will focus on problems involving the physics and kinetics of low-temperature plasmas. Of particular interest are the conditions that lead to phenomena such as nonstationariness, inhomogeneity, and high-charge density inside plasmas.

Eight new special research fields are to be established in the old federal states. Two of them belong with the life sciences. The subject matter of the special research field in Wuerzburg, "pathophysiology of cardiac insufficiency," is the interdisciplinary study of the cardiac, peripheral, and neurohumoral mechanisms that lead to weak hearts. They plan to make use of and further develop the nuclear magnetic resonance (NMR) technology in studies conducted with humans, animal, isolated organs, and at the cellular level. Close cooperation on this between natural science and medical teams is imperative.

Neurobiologists, neurochemists, neuroanatomists, and physiologists will study the "molecular and cellular bases of neuron organization processes" in Frankfurt/Main. A focus on developmental biology is part of this project due to the recognition that many organizational characteristics of neural networks can only be understood through their development.

Five of the new special research fields are to be classified with the natural sciences. Teams from the Free and Technical University of Berlin and the Genetic Research Center (GFZ) of Potsdam want to collaborate under the heading, "deformation processes in the Andes," at the Free University of Berlin; they want to look into problems involving the dynamics of the lithosphere. No other geodynamic process leaves behind it as profound changes in the continental crust as the events that occur during the formation of a mountain. Fieldwork is planned in northern Chile, southern Bolivia, and northwestern Argentina.

The special research field, "thin metallic films: structure, magnetism, and electronic properties," will also be established at the Free University of Berlin. Its object of study will be solid-state films only a few layers of atoms thick for which there are applications in, for instance, magnetic storage media and read-write heads, but also in the development of mirrors for X-ray and neutron optics.

"Multicomponent layer systems" are to be studied in Erlangen-Nuernberg. The connection between the properties of boundary layers and growth mechanisms in silicide layers and silicon-carbide polytypes will be the focus of interest. Problems of reaction kinetics and reaction dynamics are on the agenda in the Goettingen special research field, "molecular mechanisms of unimolecular processes." "Reactive currents, diffusion, and transmission" will constitute the subject matter in Heidelberg. At the Mechanical Engineering Faculty and the Economic Sciences Faculty of the RWTH [Rhenish-Westphalian Technical College] of Aachen and the Fraunhofer Institute for Production Technology in Aachen they want to study "models and methods for product and process structuring." The goal is to devise methods that can lead to a shortening of the time it takes to develop products.

#### **Germany: Need for Reform of Large Research Institutes Seen**

93WS0245A Frankfurt/Main FRANKFURTER  
ALLGEMEINE in German 3 Feb 93 p N3

[Article by Rainer Floehl: "The End of Big Science: Expensive Waste From the Past/From the Very Beginning No Policy Design"]

[Excerpt] [Passage omitted]

#### **Cosmetics Instead of Reform**

The criticism of big science has increased in recent years. Even the Federal Ministry for Research and Technology considers savings and course adjustments essential. The Bundestag Committee for Research, Technology, and Evaluation of the Consequences of Technology has concerned itself intensely with these institutions. However, despite all the criticisms, even the opposition would not like to be identified with drastic measures. It has recently been satisfied with cosmetics where radical measures are

needed, i.e., the "winding down" of all big science, at least of all the large research centers. The term "big science" should disappear along with the bureaucracy which lives from it.

To be able to correctly assess the dimensions of large research it is essential to know that the centers employ 21,500 persons, including 9,000 scientists. The expenditures are in the neighborhood of 3 billion German marks [DM]. That corresponds—in terms of persons and business—to approximately one-third of the research capacity of all the universities or three times the outlays of the Max-Planck-Gesellschaft.

If the 16 centers—13 in the old states and three in the new—are examined more closely, three groups emerge with different purposes and possibly different fates. For one group of institutions the designation big science is justifiable because the activities revolve around large, expensive pieces of equipment, such as accelerators for elementary particle research or systems for nuclear fusion. This group includes the German Electron Synchrotron (DESY) and the Society for Heavy Ion Research (GSI). These centers enjoy a high reputation internationally. They cooperate closely with the universities. They could, with the exception of the Institute for Plasma Physics, which belongs to the Max-Planck-Gesellschaft, be operated as independent foundations.

The second group includes institutes which are large research centers only because they—more or less accidentally—came under the jurisdiction of the Ministry of Research. The German Cancer Research Center in Heidelberg (DKFZ) is an extrauniversity research center, such as already existed in other countries at the turn of the century. The Alfred-Wegener-Institute (AWI) in Bremerhaven is also a conventional, interdisciplinary center for polar and oceanic research, even though the research ship "Polar Star" is unquestionably a large piece of equipment. It could however—like the "Meteor"—belong to the research community. The Society for Biological Research (GBF) in Braunschweig was created on the whim of a Nobel prize winner and a scientist friend of his. After many difficulties, it also came under the jurisdiction of the Ministry of Research. There are no compelling reasons to permanently continue to run this biotechnology research institution independently. Affiliation with the Technical University of Braunschweig suggests itself.

The third group of large research centers includes institutions which do not concentrate on one topic and thus are very questionable. Their activities are defended with the argument that they are long-term national programs which the government must organize. In environment and health, for example, there are important problems which the government must solve over the long term. For these supermarket activities the term "precautionary research" has found its way into the language in Germany.

Finally, the government believes it is required to support the development of technologies which are of particular

public interest: Information technology, biotechnology, environmental engineering, and energy technology. Consequently, the multiple centers are active in several of these fields. That results in significant management difficulties. Currently, there is even a committee which coordinates the environmental activities of eight centers among each other. This association corresponds to an additional "disjointed" super large research center. It is precisely in this area that questions are arising about the special nature of big science. Even in materials research, as recently noted by the Scientific Council, universities and large research centers are becoming increasingly similar. Although the research minister recently relieved of his duties once stated that the large research centers should do only what others—the universities—cannot do: He never followed up on the consequences of that. He wanted to leave that to the experts who are supposed to take up this task in a couple of years. Only in environmental research has the evaluation by the Scientific Council already taken place.

Consequences were already required in the transformation of the two large nuclear research centers in Karlsruhe and Juelich. Although these had largely completed their work, they had not been closed or at least significantly down-sized. Instead, new task were sought and found for them. A particularly bad example is the nuclear research center in Karlsruhe. There, among other things, environmental research is being conducted—difficult to picture with metallurgists and nuclear physicists. Steven Weinberg, the director of the American Oak Ridge National Laboratory for years, already pointed out in the 1950s that there is little promise in moving researchers to work on tasks outside their field of expertise. Scientists have always liked to continue doing what they have always done.

#### The Bid for Outside Financing

Karlsruhe still has a budget of DM450 million; that makes it the most expensive large research center. The story continues to circulate that the funds for Karlsruhe would be cut, but that is obviously slight of hand. Thus, the basic financing available for research and development of DM91 million in 1990 is being reduced to DM80 million in 1995, in other words, instead of 1.6 million, 20 million has to be found by 1995. The other large research centers have also been recommended to look more intensely for outside financing because of the financial stagnation. This means that the generously equipped centers now also have to compete for these scarce funds with the already impoverished universities.

In the medical field, a supermarket similar to the nuclear research center in Karlsruhe—and also to the former the nuclear research center in Juelich—is the GSF, the former Society for Radiation Research in Neuherberg, which now calls itself the Research Center for Environment and Health. According to the research policy principles of the Ministry of Research, it is considered

"large research specific" because of the long-term perspectives and the interdisciplinary nature of its research. The sheer effort here is thus directed to generous support rather than to scientific necessity. The GSF began as a dwarf in 1960 with an Institute for Irradiation Safety Research and an Institute for Irradiation Safety. Hematology, biophysics, genetics, nuclear biology, biophysical radiation research, microbiology, radiation botany, plant genetics, and medical data processing were added. With the addition of an Institute for Radiohydrometrics and for Ecological Chemistry, expansion began in the direction of environmental research. The Salzberg factory Asse, which added environmental toxicology, was acquired. In the 1980s, the research program was evaluated; one-third of the existing institutes were dissolved and re-established: Institute for Biochemical Plant Pathology and for Molecular Virology, the Inhalation Project, the Institute for Soil Ecology, the Institute for Molecular Biology, and the Institute for Epidemiology. No end is in sight unless funds fail to materialize.

On the insistence of the Bundestag Committee, the Ministry of Research has thoroughly explained the planned savings measures—a budget freeze through 1995. However, real reforms are not discernible. That means that everything continues as before. However, it is obvious that big science as such has no future. For the sometimes outstanding centers thoroughly dedicated to one topic, supporters should be found to attract the influence of the Ministry to them. The remaining institutes must, gradually, be dissolved—either by closing departments which no longer perform timely research, or by shifting them to nearby universities. The funds thus freed must not go into large new projects, but, instead, should flow to the research community, which is still the best guarantee for good research in this country.

#### **German Research Institutes Compare Pre- and Post-Unification Competitive Technologies**

93WS0248A Duesseldorf VDI NACHRICHTEN  
in German 8 Jan 93 p 3

[Article by: Birgit Gehrke, Harald Legler, and the Hariolf Group "Research Ensures Jobs: Germany Has Become the Leading Producer of Products to Protect the Environment"]

[Text] VDI-N, Karlsruhe, 8 Jan 93—*The research-intensive industrial branches proved themselves the strongest locomotives of growth in the West German economy in the 1980s. The authors of the following article, the Hariolf Group at the Fraunhofer Institute for Systems Technology and Innovation Research (ISI) in Karlsruhe as well as Birgit Gehrke and Harald Legler of the Lower Saxony Institute of Economic Research (NIW), have produced a new evaluation of Germany's standing in high-tech since reunification.*

In the period 1984-1990 production in the branches of industry that are not research-intensive grew at an

average yearly rate of 1.6 percent, while in the research-intensive branches it increased at a rate of 3.4 percent yearly. Investments in the research-intensive sectors actually increased at an average yearly rate of 8.2 percent. Research-intensive branches are defined as those in which at least 3.5 percent of the company's turnover is invested in research and development (R&D).

The expansion in industrial employment was especially attributable to this trend in the research-intensive industries. The jobs created in the period from 1984 to 1989 in West Germany were almost exclusively in the research-intensive sector. Moreover, those industries also generally proved to be crisis-resistant. They were less affected by recessions and were able to accelerate more rapidly during ensuing economic upswings than were the industries that were not research-intensive.

As a rule, the innovation potential of a country is demonstrated by the proportion of appropriations set aside for R&D from the overall production figure. By this measure, former West Germany occupied a top position even in industrial research. But precisely how the R&D outlays affect the end results achieved is still being discussed.

Patents are more indicative of innovation progress. With reference solely to patents from throughout the world, which have been registered in the economic triad regions, i.e., the United States, Europe, and Japan, one obtains a good index for innovative activities that have worldwide marketing significance. There were turbulent developments in the 1980s. In the high-tech sector, patents in the triad regions increased by more than 5 percent annually. Closer scrutiny reveals that the acceleration of technical change was more pronounced in the high-tech areas than in the higher value technologies. Characteristic of the field of the key high-tech industries is the fact that their patented inventions are almost exclusively aimed at the most promising marketable products. It is therefore not surprising that the protected areas, where it is customary not to reveal trade secrets, did not contribute even as much as 2 percent of the inventions. Within the protected high-tech fields, the bulk of inventions pertain to aviation. Many of the strong growth areas among the key competitive technologies are in the field of information technology. Inventive activity is also very dynamic in the so-called service machinery industry (air conditioning, automatic coin and ticket dispensers, vending machines, etc.).

In foreign trade Switzerland, Germany, and Great Britain show considerable comparative advantages in research-intensive chemical products, a field in which Japan has not specialized. Europe's weaknesses are evident in the fields of bio- and genetic engineering. With the exception of Great Britain, information technology is Europe's major weakness. It is, on the other hand, the special strength of the United States and Japan, with Japan moving into the lead.

In research-intensive machinery manufacturing, the German-speaking areas and Japan share specialization advantages. Unfortunately, the German machinery manufacturing sector is now showing some structural problems, which are being aggravated by the present drop-off in investments. The production of public transportation vehicles has long been the domain of German and Japanese companies. However, this particular marketing advantage is colored somewhat by protectionist measures.

A particular strength of the Federal Republic has been in the production of environment-protection products, especially in waste and sewage technologies; measurement, control, and regulating systems; and air purification technologies. With a world market share of more than 21 percent in 1990, Germany is far and away the largest producer of products designed to protect the environment; the United States has 16 percent of the world market, and Japan 11 percent. Thus, German industry currently enjoys a favorable initial position in this expanding market segment.

On average, inventive activity is three years ahead of marketing results. Germany displays an impressive concordance in the structures of patents and those of foreign trade. Neither in its positive nor negative trends is there any doubt. Entertainment electronics, communications, and EDP are the traditional weak points in the field governed by microelectronics. Machinery, vehicle, and instrument manufacturing are all very well represented both in technology production as well as on the market. Pharmaceuticals are relatively weak.

Following German reunification, a thorough reevaluation of Germany's standing in the competition for world markets in research-intensive products was in order. The data gathered for this analysis indicates that there is still a high degree of specialization in research-intensive products for the now reunited Germany as well. However, Germany's relative "lag" in such products relative to Switzerland and Japan has become even greater, while her "lead" over the other major high-tech producers has been significantly reduced. In 1991, only 2.5 percent of German research-intensive exports originated in the new eastern States, while overall exports from those regions fell almost 60 percent from the previous year. Employment trends in the former GDR were just as dramatic. Since mid 1991, i.e., within a single year, half of the jobs in industry and half in the research-intensive sector have been lost. Especially troublesome is the pronounced reduction in R&D capabilities in the former East German companies, which, in turn, adversely affects the technological competitive position of Germany as a whole.

Overall, the analysis shows a number of strengths as well as weaknesses in the German economy, both in the technological sense as well as in its market position. At the present time, owing to the worldwide drop in demand, the strengths of the traditional higher value technologies count less than in previous years, and the opportunities present in the growing markets of the newer key technologies cannot be adequately utilized.

### **German Trade Ministry Criticizes Trust Agency Strategy**

93MI0253 Bonn DIE WELT in German 8 Jan 93 p 11

[Article by Hans-Juergen Mahnke: "Trust Agency Under Fire—Ministries in Bonn Accuse Berlin Agency of Applying Ineffectual Salvage Policy"]

[Text] The Trust Agency is coming under increasing criticism from German federal ministries, which accuse it of having an ineffectual company salvaging and modernization policy. For example, the ministries of finance and trade claim that the companies still owned by the Trust Agency have suffered a marked deterioration in quality over the past 18 months.

Both ministries take the view that this has been caused not only by the global recession, but also by insufficient investment in promising sectors.

According to a Federal Trade Ministry analysis, Trust Agency-owned companies had invested 11 percent of their sales revenue in research in 1991, whereas last year the figure was down to 7 percent, and sales figures themselves had fallen drastically too. This trend is confirmed by a survey conducted by the Halle-based Institute of Economic Research (IWH), according to which the current decline in industrial production is accompanied by a reduction in research investment, in spite of the fact that this is the very type of investment needed to trigger an upturn in the eastern German economy.

The Trade Ministry also considers that the Trust Agency has paid too little attention to distribution and marketing, areas where there are still major problems. However, the ministry only changed its own policy towards eastern German companies last fall, when it decided that they should no longer focus primarily on sales to the former COMECON states, but should sell to the industrialized countries of Western Europe. This policy change will not only cost money, but will also require the services of experienced marketing professionals, and the Trade Ministry now finds that these are in short supply among eastern German firms.

The ministry places its hopes in limited management partnerships, which it believes can facilitate the salvage process by recruiting managers with experience of salvaging companies. Both ministries regard the growing number of privatized former Trust Agency companies already threatened with bankruptcy as critical. These companies may have been sold to the wrong investors.

According to the Halle institute's analysis, industrial research continues to decline in eastern Germany, the number of industrial researchers in the new laender having fallen to date from 75,000 early in 1990 to 15,000. Some privatized firms have even completely closed their research departments, while Trust Agency-owned firms are continuing to reduce their research workforces.

**France: INRA Seeks Research, Technology Transfer**  
93WS0253A Paris AFP SCIENCES in French 28 Jan 93 p 1

[Unattributed article: "Research and Technology in France: The Era of Networks"]

[Text] Paris—During the past 15 years, France has pulled itself up to the fourth rank of industrialized countries in the field of research; it is on the right track, but increasingly complex relations between science and competitiveness now require it to "adopt a system of networks," the INRA [National Institute of Agronomical Research] president, Mr. Guy Paillotin, pointed out on 26 January, when he presented the preliminary report of the 11th Plan on Research and Technology.

In order to increase the vitality of these "networks"—which might be privileged by community, national or regional programs—the authors of the report stressed the central part played by interactions between laboratories, large industrial groups, small and medium-size industries, technical and financial centers, and the government. Actually, all of these are involved in the mechanisms through which research, technology, and innovation contribute to competitiveness, Mr. Paillotin, who chaired the working group, explained. The reporters also stressed the imperative need to decompartmentalize institutions.

The report also reaffirmed the need to pursue the research-financing effort, as large rival countries still devote an increasing part of their incomes to it. "With 2.4 percent of its gross industrial product devoted to R&D, France now lags behind Japan (2.9 percent), the United States, and Germany (2.8 percent)," he recalled.

"Continuity is a must to consolidate the progress achieved in the past 15 years or so through unprecedented mobilization," the plan commissioner, Mr. Jean-Baptiste de Foucauld, pointed out for his part.

"At a time, we feared there might be a scarcity of scientific personnel," Mr. Paillotin further indicated. "This risk has now been curbed, but we should promote researchers mobility, and in particular their movement toward teaching. This will not prevent them from pursuing their research."

We should also develop training through research and encourage scientists to turn to companies and popularize their knowledge, the report estimated. All this supposes that activities of this type are considered in evaluating researchers' careers; for the time being, however, evaluation criteria are of a purely academic nature.

Finally, the working group proposed to redefine the State's responsibilities as far as scientific and technological policy is concerned, with companies, the regions and the European Community playing an increasing role.

The State must support basic research, but its first responsibility is to identify major research objectives for the benefit of all R&D actors. "The ambition of the 10th plan was to progressively raise national R&D expenditures to 3

percent of the gross industrial product. It is essential not to slacken this effort," Mr. Paillotin concluded.

**France: CNRS Wants Closer Industrial Ties**

93WS0253B Paris AFP SCIENCES in French 28 Jan 93 p 2

[Unattributed article: "CNRS [National Center for Scientific Research] and Manufacturers Want to Strengthen Their Cooperation"]

[Text] Paris—Meeting at a forum in Paris on 27 January, the CNRS and its principal industrial partners estimated it necessary to strengthen scientific cooperation, which they see as a priority in achieving economic development.

The partnership between industrial and scientific circles "is assuming increasing importance in an economic context whose problems are well known," Mr. Francois Kourilsky, the CNRS general director, stated in his keynote address entitled: "Research as an Asset in the Economic Battle." Relations between public and industrial research must therefore be developed in order to increase French firms' participation in research efforts.

"Technological breakthroughs may lead to scientific discoveries, just as breakthroughs of a conceptual nature may lead to technological developments," Mr. Kourilsky pointed out.

Ties between the CNRS and firms which, according to Mr. Kourilsky, have become "numerous and intense," are mostly geared to research with shared objectives. "As a rule, such collaboration accounts for activities worth close to 1.4 billion French francs [Fr], whereas the 1993 budget amounts to Fr11.492 billion."

The CNRS, which intends to invite manufacturers to strengthen their partnership with it, submitted its report on current conditions for their comments; the reports present a panorama of the present state of science and its prospects. An additional consultation also took place in October and November 1992, through a survey of some 50 firms; it served to identify the themes considered at the forum workshops: these include environment and health, the challenge of aging, and the impact of new technologies on society.

Additional meetings between the CNRS and firms might be organized soon, Mr. Kourilsky suggested, this one being only the "first decisive stage, geared to consultation."

**Germany: Appointment of New Research Minister Viewed**

93WS0258A Hamburg DIE ZEIT in German  
29 Jan 93 p 40

[Article by Nina Grunenberg: "Research On The Leash: Why Research Minister Heinz Riesenhuber Stepped Down and Why His Successor Matthias Wissmann Is Inheriting A Tough Job: Business Attempts To Harness Science"]

[Text] Heinz Riesenhuber should be grateful to his successor. Only in comparison with Matthias Wissmann could he appear as great as he believes himself to be. The laurels bestowed upon him last week for his 10 years as Minister for Research and Technology acknowledge him as one of the last of the technical ministers possessing knowledge in his field. The intellectual abilities of Riesenhuber, who holds a Ph.D. in chemistry, are undisputed.

Matthias Wissmann does not have the advantage of this scientific background. Neither his training as a lawyer nor his position as economic policy speaker for the Christian Democratic Union (CDU)/Christian Social Union (CSU) Bundestag caucus suggests any particular qualification for the office of research minister. He owes his appointment primarily to regional proportional representation. Since Wolfgang Schaeuble became chairman of the CDU/CSU caucus, Baden Wuerttemberg—the only western land in which the conservatives still share power—no longer has a representative among the federal ministers. As one of the four district chairmen in southwestern Germany, Wissmann feels [that he is entitled] to make demands. Another factor that worked in his favor is his age: At 44, he is 13 years younger than Heinz Riesenhuber.

Some of those in the field believe that a research minister should at least have certain cultural ties to science. From this perspective, the change in ministers seems to make no sense. But anyone who has followed the discussions on research, discussions which over the past two years or so have begun to center around basic research, will suspect other reasons for the appointment of an economist custodian of research. For some time now, a coalition of economists, application-oriented scientists, and research and development (R&D)-oriented parliamentary members from the CDU/CSU Bundestag faction has been pushing for the creation of a planning and structural policy agency. Under this agency, which would be modeled after the Japanese Ministry of International Trade and Industry (MITI), scientists, economists, and politicians would work together to develop joint strategies for the future. The business community, afraid of losing ground on the international market, is demanding that scientists work more closely with industry and shorten the interval between the "drawing board" and the "production line."

The debate over "Research in Germany" is still incoherent and somewhat panicked. In an attempt to stimulate discussion, the CDU/CSU Bundestag caucus has scheduled a hearing on "The State of German Research and Technology" for 11 February. Typically, the information paper that is to serve as the basis for the discussion referred to universities not as the mainstays of basic research, but as mere educational institutions. This ignores the fact that approximately 80 percent of all basic research is still conducted at universities. (Only 10 percent takes place in institutes of the Max Planck Society.)

Nor did the CDU/CSU invite the German Research Association (DFG), which finances research at universities, or the Conference of University Rectors. Christian Lenzer, chairman of the CDU Committee on Research and Technology, blames them for the "Isolation of Basic Research," and urges them to end this isolation. Wolfgang Fruehwald, DFG president, who is very generous with funding, countered that "in a civilized nation such as the Federal Republic of Germany, we may study even the antiquity, if we wish, without being accused of wasting money."

Basic research, which Germans have traditionally regarded as the guarantor both of technological development and their society's ability to prosper in the future, has been put on the defensive. Because basic researchers must maintain a certain aloofness from industry, they are now being accused of being out of touch with the market. The research environment has soured, in part because of the deteriorating reputation of the colleges and universities. Not even the reception of the Nobel Prize, generally regarded as a positive indicator of the status of research in a country, was able to reverse this development. The CDU claimed it as its due and proceeded with the agenda. On that agenda are these simple questions: Does basic research receive too much funding? Does industrial research receive too little? Can business shift a portion of the responsibility that it now bears for research over to the state?

One thing to consider is that, at the very moment when the Germans are beginning to model their research program on the Japanese program, the Japanese have decided to abandon it and are beginning to invest heavily in basic research. Nor is it certain that the German critics of basic research know what they are doing. "The laboring of the concept" which, according to Hegel, is the foundation of science, has thus far been ignored in this discussion. As far as Hans Georg von Wartenberg, chairman of the Association of German Industry, is concerned, it is irrelevant whether the research is termed idea-oriented, application-oriented, free, pure, or industrially-oriented. The important thing is that it be "practical and product-related," and that it enable German industry to hold its own on the world market. Many in his circle are of the same mind.

Few of them are sorry to see Heinz Riesenhuber go. The chemical industry in particular bears him a grudge for allowing other ministries to take the lead in drafting the law on genetic engineering and not asserting himself more. Riesenhuber was particularly fond of passing himself off as a "friend of basic research," believing this to be the best image for him. He also hoped that it would help separate him from his Social Democratic predecessors, who caused an uproar in the scientific community during the 1970s when they introduced the concept of "social relevance" into research. It did not get them very far. The Social Democrats quickly recognized the importance of basic research as fertile soil for the technologies of the future and as a training ground for scientists who are later expected to have an innovative influence on

industrial research. They asked only that the scientists provide better justifications for their funding requests. (re: Helmut Schmidt's comment on the "special debt of science".)

It was never clear whether Riesenhuber believed that financing for industrial research and development should come from the research ministry budget or be obtained more indirectly through taxes. To prove statistically how successful he was in funding basic research, Riesenhuber often labeled application-oriented research idea-oriented research. He was able to do so because the distinction between the two fields is very fine and a separation is often arbitrary.

But his maneuvering sowed the seeds of mistrust. The basic researchers claimed constantly that he provided substantially more funds for applications-oriented programs than for their projects. He also generated uncertainty within his own caucus, which asked itself if its research minister was neglecting directly applied research, which has a direct effect on industry.

The semantics games that Riesenhuber played are catching up with him. Nevertheless, they are a useful example for his successor, who has less than two years to show success. In order to appear sympathetic towards industry, he need only switch the labels.

As a career politician whose only formal qualification is his ability to get bills passed in parliament, Wissmann will also be smart enough to avoid another of his predecessor's accused shortcomings. Riesenhuber concerned himself with nothing but the Research Ministry. "He did nothing for the party," is the word in Bonn. Whenever trench warfare broke out among the parties, Riesenhuber remained on the sidelines. Because he avoided conflict, he seldom took the initiative to introduce research or scientific policy issues into cabinet-level discussions. According to one observer, he behaved like a good arbitrator, content to stay in the background. He demonstrated his tremendous knowledge only when pulled into a discussion. Once Riesenhuber had sufficiently impressed his colleagues with figures, facts, and background information, the chancellor would generally end the debate with the pointed comment that it would be nice if the public—in this case the cabinet, party, and caucus—could benefit more frequently from Riesenhuber's vast store of knowledge.

The chancellor considered Riesenhuber dispensable because he was unable to take charge of and lead the discussion that concerns and worries many people.

How good are the Germans? Are they retaining their dominance in technological development? Or was Konrad Seitz, former chief of planning in the Foreign Relations Committee, correct when he said that "Germans are simply falling behind intellectually in the area of high technology"?

Do we have an education system that can provide the foundation for "growth through intelligence"?

Is it true that German dependence on Japan and the United States in the fields of microelectronics and biotechnology is increasing?

Was Dieter Simon, chairman of the Scientific Counsel, correct when he said that Germany is a leader in the traditional fields of physics and chemistry, but less so in the increasingly important life sciences and new technologies?

Up to this point, the tone of the discussion has been set primarily by economists. When they speak, the members of parliament just nod their heads in agreement. This must change. But will Matthias Wissmann be capable of enriching and controlling it intellectually?

According to a long-time companion, Wissmann became Minister for Research and Technology "because he would have been ruined if he had not been given a turn now." Because they are aware of this, his fellow caucus members will attempt to put his modest reputation as an orderly-minded politician to the test. The CDU/CSU has always tended towards interventionist misuse of the Ministry for Research and Technology. The research policymakers within the caucus look out for their own particular region, and attempt to use the research budget for the benefit of their constituency. Projects for "energy from replenishable sources" are currently very popular with representatives from agricultural regions, and windmills are the favorite plaything of representatives from the northern regions.

Consequently, the first thing that the new research minister will have to demonstrate is his ability to stand fast.

#### **FRG Research Minister Wissmann Comments on Policy**

*93WS0258B Frankfurt FRANKFURTER ALLGEMEINE in German 1 Feb 93 p 11*

[Article by "Stue" datelined Bonn, 31 Jan: "Wissmann: When In Doubt, Let The Market Decide: Research Minister Rejects New Industrial Policy Institutions; No Layoffs In The East"]

[Text] During his first days as research minister, Matthias Wissmann did more listening than talking. This is likely to continue for the next several weeks. He has, after all, a lot to learn in many areas. "I tend not to be very quick off the block," said Wissmann in an interview with the FRANKFURTER ALLGEMEINE. Meetings such as the one Wissmann held in Berlin with the leaders of 100 new eastern German non-university research institutions are designed to aid the new research minister in his inventory of the situation. Wissmann has had long conversations with his predecessor Heinz Riesenhuber. Discussions with representatives of science and industry are also planned.

The questions that most concern Wissmann here are those which he believes represent his objectives as



research minister. How can the research infrastructure be more efficiently organized? How could small and mid-sized firms obtain access to research materials without having to deal with red tape? How can research findings be more quickly translated into products? According to Wissmann, a new minister cannot begin his term in office by requesting more money. "Only someone with intelligent and convincing ideas can do that." He believes that his job is to more clearly determine which research policy issues should be given top priority and which should be given lesser priority. Since 1982, the number of federally-funded research projects has risen from 6,000 to 10,000. As unpleasant as it is, the attempt must be made to reduce this figure. Since reunification, the federal budget has increased by 30 percent. In comparison, the research budget has risen by only 6 to 8 percent—depending on the method of calculation—to 9.5 billion German marks [DM]. Wissmann believes that financial flexibility must be maintained at the very least, and, if possible, carefully increased.

Wissmann's response to calls from all political camps, even the Christian Democratic Union (CDU), for more federal commitment to key technologies, from micro-electronics to chip manufacturing, is to cite his "market economy industrial policy." He will hold to his basic philosophy of "When in doubt, let the market decide." Wissmann believes that new developments, even if they are state-supported, will not survive long if there is no demand for them on the world market. Wissmann believes that the real task of research policy is to support basic research, encourage innovation, and give new impetus to previously unprofitable branches of industry. Its task is not to commit the government to projects in which industry itself does not care to participate.

As far as Japanese dominance is concerned, such as in the memory chip industry, for example, Wissmann believes that the remaining European manufacturers must learn to cooperate with one another. He feels that the research minister must contribute to the establishment of a consensus, both on a national and a European level. Wissmann is not in favor of the establishment of either new institutions or a bureaucracy patterned after the Japanese Ministry of International Trade and Industry (MITI) designed to develop a German or European strategy for overtaking Japan.

With his tendency towards orderly thinking, the new minister has no problem with the idea of "pragmatic solutions" in eastern Germany. He does admit, however, that he will be walking a narrow tightrope where this is concerned. To illustrate, Wissmann cites the attempts to stabilize industrially-oriented research in the new laender. "We cannot guarantee these institutions a future unless there is a chance that they will be able to support themselves in the long run." On the other hand, research institutions are critical to the maintenance of the industrial core of eastern Germany, in particular because they occasionally produce developments that do not exist in western Germany. Wissmann is encouraged by the recent addition by the Coalition of another

DM200 million for industrial research in the eastern laender, split between two years, to its fiscal package. This money, together with the DM380 million available for market-oriented research 1993, will enable 9,000 of the 24,000 remaining research positions to be secured. This, in the wake of the harsh consolidation by Riesenhuber, would give personnel in eastern German non-university research institutions new hope for the future. Wissmann would like to avoid, at least in eastern Germany, the 1.5 percent layoff (470 of the 32,000 positions in 1994) imposed by the finance minister on all financially supported research institutions. However, this would mean deeper cuts in western German research positions.

### **German Max Planck Society Funding Crisis Said to Increase**

93MI0265 Bonn WISSENSCHAFT WIRTSCHAFT POLITIK in German 9 Dec 92 p 2

[Text] The Max Planck Society (MPG) is not just confronted with a downturn in investments: Its project funding also threatens to diminish in the wake of savings measures.

For years, the MPG has experienced no real growth in investment. Staff costs are squeezing out material costs, and, within the material costs category, spending on consumable supplies is squeezing out investments, said MPG President Hans F. Zacher last week at the annual press conference.

According to Zacher, the restructuring of the research scene in the new federal laender is successfully under way. The MPG has established two institutes, two branches, and 28 teams at universities. In addition, seven priority humanities research programs had been taken over in trust, said the president. The MPG Board had already resolved to set up four additional institutes as well, but the government's current medium-term budget up to 1997 covered the funding requirements for only two of the 10 new institutes planned.

Zacher said: "The MPG intends to secure for the new laender the same level of research excellence that prevails in the original ones. This calls for the maximum joint effort on the part of federal government, laender, and the MPG, in order to achieve the optimum in terms of research and administrative policy."

### **A Political Challenge**

The president saw further "research obstacles" in the administrative implementation of the law on genetic engineering that came into force in 1990, and in the current discussion on reshaping animal protection legislation. The MPG's proposals on these issues had had a positive reception at the political level. "The world of politics must now hold fast to its good intentions," said Zacher. Regarding animal protection, the MPG is against "unreasonable" restrictions that would place research at a disadvantage.



### Germany: BMFT Funds Establishment of Four Additional R&D Institutes in New Laender

93MI0285 Bonn *BMFT JOURNAL* in German  
Dec 92 p 2

[Text] The restructuring of the former east German Science Academy that took place as part of the unification process has now resulted in the inauguration of four new institutes. They were established in the light of Science Council recommendations attesting to the institute's outstanding scientific work and recommending that they be run as "Blue List" institutes. The BMFT [Federal Ministry of Research and Technology] and the respective host land will each provide 50 percent of the funding for the new institutes.

The new **Institute of Semiconductor Physics** in Frankfurt/Oder recently took on 150 staff. As the Institute's pioneering work, primarily in nanoelectronics, fills a gap in German semiconductor research, the BMFT has been quick to provide more than 10 million German marks [DM] for urgently needed new research equipment. The soundness of this investment has been demonstrated not least by the award of the Beckruster prize to one of the institute's leading scientists.

In applied mathematics, the former GDR Science Academy was among the very best in the world, but a publication ban was formerly imposed on most of its applications-oriented work. The establishment of the **Institute of Applied Analysis and Stochastics (IAAS)** means a new start in a liberal environment. Research work for the 85 staff at the IAAS will concentrate on differential and integral calculus, and on aspects of probability theory and its applications.

The **German Institute of Nutritional Matters** in Potsdam is another of the new establishments. It will work on the prevention of chronic diseases resulting from incorrect nutritional habits.

The **Institute of Neurobiology (IfN)** in Magdeburg is a cornerstone in the structure of Germany's neurobiology research facilities. With a strong emphasis on medicine at its university and a rehabilitation center for neurological patients being built in the immediate vicinity, Magdeburg is an ideal location for this institute.

### Funds for German Research Institutes Allocated

93MI0318 Bonn *TECHNOLOGIE-NACHRICHTEN*  
*MANAGEMENT-INFORMATIONEN* in German  
15 Jan 93 p 7

[Text] Within the 1 January 1993 deadline, the federal and land governments concluded their negotiations regarding the distribution of the Special Investment Program funds. Federal funding to the tune of 200 million German marks [DM] and another DM67 million in funding from the laender are thus available from the beginning of 1993 through 1996 for investment in equipment, building renovations, and new building work in nonuniversity research facilities. This is in addition to the regular investment resources already featured in the institutes' budgets.

Following these, often tough, negotiations, it was established by mutual agreement that the funds would be distributed as follows:

Berlin	DM58.56 million
Brandenburg	DM53.12 million
Mecklenburg-Western Pomerania	DM17.65 million
Saxony-Anhalt	DM33.36 million
Saxony	DM72.11 million
Thuringia	DM31.87 million

This funding is expected to cover the considerable ground that the new nonuniversity research facilities need to make up, and which could not be met in the short term out of the regular investment allocations set aside in their budgets. The Special Program extends to Max Planck institutes, Fraunhofer institutes, Blue List establishments, national research centers, and land-level research centers.

### France: 1993 Microelectronics Subsidies Up 14 Percent

93BR0364 Paris *ELECTRONIQUE INTERNATIONALE*  
*HEBDO* in French 14 Jan 93 p 7

[Text] The effort to support R&D will continue in 1993 and will result in new projects.

In 1992, the Ministry of Industry and Foreign Trade allocated 2.68 billion French francs [Fr] to the French electronics industry's research and development programs (not counting the Fr2 billion capital appropriation to Bull). That is a budget increase of 11 percent compared with 1991. The increased subsidies for companies' R&D programs are channeled through multiannual research contracts with big companies (like Bull, Thomson Consumer Electronics, and SGS-Thomson), the European EUREKA [European Research and Coordination Agency] programs, and aid to SMEs [small and medium-sized enterprises] (see table). According to Dominique Strauss-Kahn, the minister for industry and foreign trade, the total of these subsidies should increase to 14 percent in 1993, subject to the Ministry of Industry's budget being passed. The continuation of this policy of R&D support will result in new projects in 1993. Thus, the Ministry of Industry in conjunction with the Ministry of Research will this year launch a joint call for proposals in the area of "microsystems" with a view to strengthening the development of French microsystems (microsensors, microactuators, signal processors) in all of the big industrial sectors (automobiles, automatic control, instrumentation, and environmental protection). Moreover, the large-scale EUREKA program on "the factory of the future" will be the subject of a feasibility study in the majority of European countries.

There are several [French] ministries that directly or indirectly grant subsidies to the French electronics industry's research programs. These ministries include Defense, PTT [telecommunications], Research, National Education, and Transport.

Ministry of Industry's 1992 R&D Subsidies

Field	Amount	Comments
<b>Multiannual Contracts Supporting R&amp;D</b>		
Bull	Fr600 million	Fr2,680 million for the 1991-1994 period
Thomson Consumer Electronics	Fr512 million	subsidy increased in 1993
SGS-Thomson	Fr450 million	subsidy increased in 1993
Matra MHS	not known	new subsidy in 1993
<b>EUREKA programs</b>	<b>about Fr790 million</b>	
JESSI <sup>1</sup>	Fr268 million	approx. Fr300 million in 1993
EU-95 (HDTV <sup>2</sup> project)	Fr200.5 million	third phase (Fr1.6 billion) launched in early 1993
Data processing	Fr121 million	
Prometheus (automobile electronics)	not known	Fr70 million in 1993
DAB (Digital Audio Broadcasting)	Fr13.8 million	
VADIS	Fr9.7 million	project for standardization of compression algorithms used in digital television
Factory of the Future		1993 feasibility study
<b>Flat panel display scientific program</b>	<b>Fr106 million</b>	program continued in 1993
<b>Total subsidies given to SMEs</b>	<b>Fr550 million</b>	
1. Through ANVAR <sup>3</sup>	Fr150 million	
2. Through ATOUT <sup>4</sup> program	Fr280 million	3,000 companies have benefited from this program
2.a. PUCE <sup>5</sup> subprogram	Fr110 million	program continued in 1993
2.b. LOGIC <sup>6</sup> subprogram	Fr170 million	program continued in 1993; 1,100 companies already involved
3. Call for proposals aimed at increasing cooperation among passive component manufacturers	Fr40 million	
<b>PACEO<sup>7</sup> (military components)</b>	<b>Fr700 million</b>	hardening of civilian components (financed by the Ministry of Defense)

1. JESSI: Joint European Submicron Silicon Initiative 2. HDTV: high-definition television 3. ANVAR: National Agency for the Implementation of Research 4. ATOUT: program for introducing technologies into SMEs 5. PUCE: aid for introducing microelectronics into SMEs 6. LOGIC: promotion of data exchanges among companies 7. PACEO: action Program for Electronic and Optoelectronic Components

**France Encourages Small Companies To Enter BRITE/EURAM Program**

93BR0376 Paris *ELECTRONIQUE INTERNATIONALE* HEBDO in French 21 Jan 93 p 6

[Article by Didier Girault: "BRITE/EURAM Gives Small and Medium-Sized Enterprises (SMEs) Extra Attention"]

[Text] On the eve of the closing date for the latest BRITE/EURAM [Basic Research in Industrial Technologies in Europe/European Research on Advanced Materials] call for proposals, BRITE/EURAM's French contact person Francoise Girault outlines the opportunities the program offers to small and medium-sized enterprises [SMEs].

"BRITE/EURAM is increasingly seeking to conform to commercial reality," states Francoise Girault, head of the European Department at the National Association for Technical Research (ANRT) and contact person for Europe's BRITE/EURAM program in France. This development goes hand in hand with measures to encourage SMEs to enter the program, since "they tackle issues corresponding to specific needs." (SME: according

to the definition adopted by Brussels, these are manufacturing companies with a staff of fewer than 500, making a turnover of ECU38 million at the most, less than one-third of whose capital is held by a third party company.) In 1991 alone, in the fields of electricity, electronics, and instruments/sensors, these SMEs represented approximately one-quarter of the companies and research organizations involved. For the same year, 1991, projects put forward by the electricity, electronics, instruments/sensors, and design/software sectors represented less than 15 percent of the total number of BRITE/EURAM projects.

An SME can be involved in BRITE/EURAM projects in various ways. First, it can be part of the European program "without realizing it," as subcontractor of a manufacturer which is an official participant. In fact "the manufacturer is not obliged to name the subcontractor to the Commission if the operation in question amounts to less than ECU100,000," points out Francoise Girault.

**Banding Together for Research**

If it decides to enter BRITE/EURAM as a participant or prime contractor, an SME has two possibilities. First, it

can go it alone: It can then request, at any time, a feasibility bonus (a maximum of ECU30,000 over nine months) which will allow it to test the feasibility of its project (by using the services of a legal adviser, for example); depending on the results, it can decide whether or not to continue. Second, the SME can use the CRAFT (Cooperative Research Action for Technology) procedure, which has been especially designed for SMEs which do not carry out research but which are potential users of research results. Through this procedure, SMEs group together to finance jointly, to the tune of 50 percent, the research work which is entrusted to a research center (university, technical center, etc.). The other 50 percent, up to an amount of ECU1 million over two years, is provided by the EC Commission. CRAFT has been allocated a budget of ECU57 million for the 1992-1994 period out of the ECU660 million earmarked for BRITE/EURAM. In all, "some 150 projects are expected in 1993, and 50 projects are currently being financed," emphasizes Francoise Girault.

In practice, the CRAFT procedure is subdivided into two stages. During the first stage, two SMEs from two different member states must join forces to develop the research proposal and submit it to Brussels, which makes a selection every month (on average 50 percent of proposals are approved). The SMEs can then "boost" the project by increasing the number of participants. Brussels grants a ECU15,000 bonus to the company coordinating the project if it is extended. These "multiparticipant" projects are then submitted to Brussels, which, once every quarter, makes a selection as part of the so-called stage two (around four out of every five projects are approved). On average these projects involve nine SMEs.

For the future, Francoise Girault, who is also the representative for CRAFT in France, expects the procedure to be simplified to only one stage and the requirements for candidate SME participants to be relaxed.

#### [Box]

#### ECU300 Million for the Call for Proposals

Brussels has voted a ECU900 million "extension" to the total research budget of the "third framework program." Some 13.3 percent of this budget, i.e., ECU120 million, will go to BRITE/EURAM; ECU180 million, to ESPRIT [European Strategic Program for Research and Development in Information Technology]. Taking into account the balance of this increase and the money left over from the preceding programs, BRITE/EURAM is allocating more than ECU300 million to the call for proposals closing on 26 February.

This call for proposals concerns all of the BRITE/EURAM sectors except aeronautics, which already has its own budget. Moreover, in March or April this year, ESPRIT should, in its turn, issue a call for proposals worth ECU450 million to ECU500 million on themes which complement BRITE/EURAM.

#### Dutch Minister Wants To Increase Public R&D Efficiency

93BR0387 Amsterdam *COMPUTABLE* in Dutch  
21 Jan 93 p 4

[Article signed T.E.: "Dutch Ministry of Economic Affairs Wants More Efficient Handling of R&D Money—Budget for Information Technology Incentives Primarily Targeted at Microelectronics"]

[Text] Amsterdam—Dutch information technology (IT) companies have to work closer together with research institutes if R&D efforts are to be raised to a higher level. Failing this, they will be overtaken by foreign competition on the world market. This was the finding of a policy document entitled "Information Technology Policy in the Coming Years," which was presented to the Second Chamber last Tuesday by Economic Affairs Minister Andriessen.

From an overall budget of 165.9 million guilders, Andriessen earmarked 120 million guilders for the stimulation of technological research. In so doing, the minister recognized that without government support Dutch high-technology companies would fall behind their foreign competitors in the long term. "A strong competitive position is largely determined by technological leadership. The costs and risks associated with this are steadily increasing. Furthermore, the life cycle of products is growing shorter. These developments make international cooperation and scaling up essential," wrote the minister.

#### Strategic Plan

In practical terms, this means that companies must work closer together with expert knowledge centers, such as the Innovation Centers and the Centers for Microelectronics (CMEs). In this respect, there is a need to draw a strategic plan that maps out the strengths of Dutch expert centers and pinpoints company requirements. To start, 4 million guilders have been earmarked for this purpose.

The lion's share (112 million guilders) of the budget allocation for technology stimulation is earmarked for the microelectronics sector, represented in the Netherlands primarily by Philips. The money will be used, among other things, to support international projects such as JESSI [Joint European Submicron Silicon Initiative], to disseminate the knowledge gained through EC programs and ensure its implementation, and also to consolidate the relationship between the components industry and its suppliers. In this connection, it is striking that the penultimate version of the policy document also mentioned support for HDTV [high-definition television].

The computer and software branches were not treated as separate items. That touched a sore point with the branch association COSSO [Association of Computer Services and Software Companies], whose president, Mr.

R. van Zwetselaar, stated in his New Year's speech that the IT sector must not be lumped together with micro-electronics.

#### Using IT More Effectively

In the policy document, besides the need to stimulate technology, Minister Andriessen also highlighted the more effective use of IT: "The IT potential is greater than what it actually yields. Too much knowledge remains shelved. IT applications have not resulted in the expected consolidation of our competitive position." That is why the various programs set up to this end—such as DIIN, MiToe [microelectronics applications], and SBI [Funding Scheme for Branch-Specific IT Stimulation]—over the next few years will, respectively, receive subsidies of 1, 3.5, and 5.1 million guilders. Furthermore, several pilot projects (worth 2 million guilders) will be started up to show companies how to make optimal use of IT.

In addition, the proposed policy also provides for the expansion of the data communications infrastructure by stimulating pilot data communications applications and research. This involves the continuation of the Subsidy Scheme for Pilot Telematics Projects (12 million guilders per year), research into the problems of administrative data communications (including the use of EDI [electronic data interchange] by the government, 1.5 million guilders), and the promotion of large-scale data communications applications by harmonizing them among market parties (1 million guilders). At the same time, a multiannual research program at the Telematics Research Center is to be subsidized (1.5 million guilders). According to the minister, the main thing is that an agreement on standards is reached. The Ministry of Economic Affairs wants to play an intermediary's role here. Andriessen has earmarked 1.6 million guilders for activities in the area of standardization and certification in 1993. In addition, a national "IT & Law" program is being launched with a view to listing the bottlenecks in legislation and regulations governing the use of IT. A sum of 1.5 million guilders is being set aside for this. The minister states in the policy document that existing legislation is (still) not adapted to the current situation and, in some cases, even is an impediment.

#### France Demands Retention of Microelectronics Import Duties

93BR0396 Paris *ELECTRONIQUE INTERNATIONALE*  
HEBDO in French 28 Jan 93 p 7

[Article by Didier Girault: "GATT: France Requests 'Total Exception'"]

[Text] France has asked for the retention of existing customs legislation for semiconductors, consumer electronics, and professional electronics products. The EC does not agree and proposes to reduce taxes to 9 percent for the first two sectors.

Within the framework of the GATT (General Agreement on Tariffs and Trade) discussions with the United States, France has maintained its reputation as a "tough" negotiator. France has asked that the EC propose a total exception, that is to say, the maintenance of existing import duty legislation, in the fields of semiconductors (14 percent on integrated circuits), consumer electronics (14 percent on color televisions and 15 percent on tubes), and professional electronics (7 to 10 percent). The EC has not gone along with this request. In its proposal, it has accepted to reduce [import] duties to 9 percent; previously, they were higher in the fields of semiconductors and consumer electronics. For their part, the Americans would like to see [import] taxes reduced to a "double zero" in these sectors as well as in all electronics sectors. That means the total elimination of import duties. In the area of telecommunications, where current EC import duties vary between 4.9 and 7.5 percent, Brussels has not yet put forward a proposal. The community would, however, be prepared to reduce existing taxes by half if the Americans, in their pursuit of the "double zero," would follow suit with regard to their government procurement market. This is not the case at the moment, according to Brussels.

#### European Electronic Component Manufacturers Association (EECA) Requests Retention of 14 Percent on Semiconductors

In the professional electronics sector, the French have asked for the prolongation of the existing tax regime in order to ensure the protection of the PMIs [small and medium sized industries]. The community has not gone along with this proposal either; it accepted the elimination of taxes on certain medical equipment and proposed the "regular reductions" (based on the formula "the percentage deducted from existing taxes equals the percentage of the existing tax plus 20 percent") for measuring equipment, i.e., from the currently applicable 10 and 7.2 percent to 7 and 5.2 percent, respectively. In the field of information technology, the EC has proposed lowering import duties from 4.9 to 3.7 percent.

In the semiconductors field, the European Electronic Component Manufacturers Association (EECA) has indicated to us that, along with the French, they remain opposed to any idea of reducing the 14-percent tax currently levied on all foreign semiconductor imports into Europe. They have recently completed a study which reveals that production costs in Europe are more than 14 percent higher than in the United States, Japan, and Asia, taking into account the high level of charges in Europe.

However, the EC Commission has already proposed, within the GATT framework, to reduce import duties on semiconductors by 30 percent over a five-year period, and the EECA can do nothing but follow suit if this proposal is ratified by Brussels. But the association warns that there is "no question of dropping customs duties on semiconductors altogether."

## CORPORATE ALLIANCES

**France: ACRI, Digital Conclude Supercomputer Accord**  
*93P60151 Paris 01 INFORMATIQUE in French*  
*5 Feb 93 p 9*

[Text] Former Bull Group CEO Jacques Stern's project to develop a European-made supercomputer series doubtless marks the beginning of an important stage. Advanced Computer Research International (ACRI), an association which he created in 1989, has just concluded a cooperation agreement with Digital Equipment. This agreement will enable ACRI to incorporate Digital's Alpha AXP 64-bit microprocessor into the architecture it is now developing.

At the same time, the two partners will have the opportunity to cooperate on improving Digital's UNIX DEC OSF/1 operating system for parallel multiprocessor architectures. The U.S. company's dual involvement in OSF and in 64-bit microprocessor is probably the reason it was chosen for the partnership by ACRI. By working jointly on the same UNIX-based operating system, the two new allies aim to minimize development costs. It is true that betting on super high technology is costly and very risky, even when market interest in supercomputers is high.

This market is dominated exclusively by the Japanese and the Americans. The Old Continent shows a deficiency in the supercomputer field, and it will only benefit from future market growth by expanding from research alone to industrial applications.

Essentially, this is exactly the area ACRI proposes to invest in, thanks to an original architecture which is especially user-oriented and promises a good price/performance return. Digital's technological assistance, along with a financial contribution, should help too. The agreement provides Digital with a minority participation in ACRI's capital.

**France: Alliance Between Aerospatiale, Dassault**  
*93WS0225B Paris AFP SCIENCES in French*  
*30 Dec 92 p 10*

[Article: "Aerospatiale and Dassault Aviation Link Up Without Losing Their Independence"]

[Text] Paris—The Ministries of Defense and the Economy announced, on 23 December, a link-up between Aerospatiale and Dassault Aviation, and a bolstering of the capital of the two enterprises under SOGEPA [Aeronautical Participations Management Company], the holding company that exercises ownership of state participations in the capital of the two groups.

The ministerial announcement states that "the intent of this link-up is to mutually reinforce their research and development capabilities, cohere their strategies and marketing policies, and consolidate their positions

within the context of European alliances." The government, as well as the companies, stress that this "structural link-up" seeks to address the current crisis in the aeronautics and military budget sectors, while "maintaining the separate identities of the two enterprises."

To date, SOGEPA has held 20 percent of Dassault's capital shares, coupled with double voting rights. It will now receive an additional 16 percent stake from the Treasury, according to the ministerial announcement, with the state retaining a direct 10 percent stake in Dassault. This transfer does not affect the total public-sector stake in Dassault, which currently amounts to 46 percent of the enterprise's capital shares and 55 percent of the voting rights, but it does strengthen SOGEPA's position.

SOGEPA currently holds 7 percent of Aerospatiale's capital shares, the Treasury 72 percent, and, within the next few days, Credit Lyonnais 20 percent. SOGEPA is to receive an as yet undetermined but "significant" additional portion of the Aerospatiale shares held by the Treasury.

Thus strengthened, SOGEPA will now be presided by Mr. Louis Gallois, president of Aerospatiale. This information, leaked a few days ago, has revived rumors of a takeover of Dassault by Aerospatiale, it being noted that, heretofore, SOGEPA has always been headed by a representative of the state, holding no office in either of the two enterprises.

Both partners have denied this interpretation. They state in a joint release that Serge Dassault, president of Dassault-Aviation, will become the vice president of SOGEPA, by virtue of which he will sit on Aerospatiale's board of directors, just as Mr. Gallois will sit on Dassault's board of directors.

### Aerospatiale Seeks Joint Ventures

*93MI0284 Bonn DIE WELT in German 16 Jan 93 p 14*

[Article by Lorenz Winter: "Aerospatiale Seeks Alliances—'We're Going Through a Crisis'—Negotiations With Thomson"]

[Text] Far from seeing "any significant improvement" in the economic situation in the aircraft industry this year, Aerospatiale President Louis Gallois feels that the industry is "going through a severe crisis that could get even worse in the military sector, now that United States President Bill Clinton has made protection of the American arms industry one of his main priorities."

Aerospatiale chief Gallois has just become chairman of the Sogepa holding company, which will have a 25-percent stake in his firm together with 36 percent of the rival Dassault group. Over the next few weeks, a Sogepa strategy committee, chaired by Dassault manager Bruno Revellin-Falcoz, will define "specific areas of activity" in which the two firms have a common interest. Gallois is "very interested" in the negotiations over missiles

currently under way at Thomson between his partner Alain Gomez and the Irish company Short Brothers over missiles.

As far as the space sector is concerned, following the indefinite postponement of the Hermes shuttle, Gallois is seeking to "step up" the joint work undertaken by the consortium formed by his group, DASA [German Aerospace], Alcatel, and the Italian company Alenia, and the American company Loral. He is keeping a close eye on the ambitions of the American-Russian, Lockheed/Khrunichev, partnership, which hopes to launch no fewer than 66 satellites using the Russian Proton rocket by the end of the century.

Gallois, nonetheless, considers it absolutely essential to integrate the Russian aerospace industry into western European plans. "In the past, Russia's technical potential was often wrongly scorned, and there is a great risk of a sales battle at dumping prices on the world market," he says. Aerospatiale therefore plans to work "in the medium term" with other Russian firms: with Tupolev on supersonic planes, Antonov on military planes, and Ilyushin on interior fittings for civil aviation.

Japan is also on Gallois's list, though for financial rather than technological reasons. One possibility would be Far Eastern involvement in the joint Super-Jumbo project that Boeing has proposed to European firms.

The mainstay of Aerospatiale's alliance strategy will, however, continue to be its work with Germany, which, because of its long history, "extends into almost every nook and cranny of our company and is therefore absolutely indispensable," says Gallois. Should circumstances so require, a reciprocal interlocking capital arrangement would even be "conceivable," as was previously the case between Aerospatiale and MBB.

#### **Nokia, Ascom Merge Surface-Acoustic Wave Devices Production**

*93BR0366 Paris ELECTRONIQUE INTERNATIONALE HEBDO in French 14 Jan 93 p 13*

[Article signed, J.-C. G.: "Ascom and Nokia Pool Surface-Acoustic Wave Production Facilities"]

[Text] Two telecommunications equipment manufacturers merge to produce surface-acoustic wave devices near Neuchatel in Switzerland.

The LK-Products company, an affiliate of the Finnish Nokia group, and the Swiss Ascom telecommunications group have just set up a joint company for producing SAW (surface-acoustic wave) devices, components that are mainly used in portable communications and optical transmission systems. This company, called Advanced SAW Products, with its headquarters based at Bevaix, near Neuchatel, will produce the SAW devices in the same premises where Ascom already has its chip foundry.

Each of the two partners, holding half of the shares in the new company, makes its particular contribution to its operation. Ascom Microsystems will use its skills in the fields of design, development, and manufacture of SAW components, in which it made a turnover of 1.5 million Swiss francs [SFr] in 1992. Nokia, besides its technological know-how (LK-Products is one of the largest European suppliers of filters for mobile phones), will contribute with its wide-ranging distribution network and, moreover, will be responsible for managing the joint company. The SAW devices will be produced not only for third party clients, but also for use in Ascom's equipment, whose market strategy is based on corporate communications systems (such as paging systems, private mobile radiocommunications systems, etc.), and in Nokia's, which holds second place in the world ranking of mobile phone manufacturers. Advanced SAW Products' estimated turnover for 1993 is SFr3 million.

#### **Swiss PTT Enters Into 'Unisource' Consortium**

*93BR0386 Amsterdam COMPUTABLE in Dutch 21 Jan 93 pp 1,8*

[Text] The Hague—Unisource, the international telecommunications subsidiary of the Dutch and Swedish PTTs [post and telecommunications authorities], is taking on a third partner: Swiss PTT Telecom. In September, the three companies had already agreed to participate in the Unisource Satellite Services subsidiary.

Now that the Swiss PTT holds one-third of the shares of parent company Unisource, it is also acquiring one-third of the second subsidiary, Unisource Business Networks.

With its shares in Unisource, the Swiss telecommunications operator has an open window on the world. This is the result of an adjustment in Swiss legislation, which has enabled the Swiss PTT to become active internationally since May 1992.

#### **Foothold**

The international networking company of the three PTTs has now established a foothold on the Swiss market, where a large number of multinational companies have their home base. These are the kind of customers to whom Unisource wants to sell its international services.

When Unisource was founded in June 1992, its general manager, B. Verwaayen of PTT Telecom, said that Unisource wanted to conquer 20 percent of the European market for international network services. He estimated that the market was worth ECU2 billion. From the outset, it was clear that Unisource—though one of the first companies active in this market—was, nevertheless, not that large in terms of sales, compared to AT&T and Deutsche Bundespost Telekom. The Swiss PTT Telecom's entry, however, has changed all that.

## CORPORATE STRATEGIES

### French Auto Industry Faces Bleak 1993

93WS0201A Paris L'USINE NOUVELLE in French  
17 Dec 92 pp 15, 16

[Article by Alain-Gabriel Verdevoye: "More Productivity and Quality Efforts"]

[Text] The beginning of the year has seen a drop in production and a pared down work force. Manufacturers and their partners are continuing to reduce costs and delays. There is no question of letting the Japanese gain the advantage.

With slight recovery expected on the French market, but a marked overall recession for Western Europe, 1993 will decidedly not be a good vintage. The automotive industry has really no luck. Just when it can finally hope for a hint of improvement in Metropolitan France, exports take a plunge. And the outlook is getting darker day by day: within one month PSA reduced its production forecast by 60,000 cars for next year. The same worries exist at Renault. Philippe Gamba, marketing director for the firm with the diamond-shaped logo, says "we see a drop in production for the first semester compared to the same period in 1992. On the other hand, the second part of the year will be a little better. Overall, we will end 1993 with a slight drop."

Manufacturers and subcontractors are bracing for bad times at the start of the year, while hoping that under the influence of a recovery in France, the coming work schedule will bring them better surprises than it did in 1992. It was last October that French automobile production began to falter and then to cave in drastically, victimized particularly by the drop in the German market. The consequences of this are already harsh: PSA has to interrupt its production this month for four days in Sochaux, five days in Rennes and in the Mulhouse mechanical plants, and six days in the diesel-engine plant in Lille. The situation could get even worse. In January, PSA and Renault are expected to manufacture no more than 240,000 cars (compared to 313,000 in January 1992), according to the CCFA (French Automobile Manufacturers Commission).

With these expectations, the manufacturers are adopting social measures, forced by increased competitiveness and fewer orders. Renault will thus eliminate 2,250 jobs next year; and Valeo is losing 150 positions in the lighting-signaling operation, and 200 jobs in clutch and friction materials; according to the unions, the engine cooling and interior heating divisions will probably also be affected. Bendix, subsidiary of the American Allied Signal which manufactures brake systems in France, has just closed its plant in Les Gras in the Doubs region (80 employees). As for Magneti Marelli, it might eliminate 5 percent of the 1,050 plant jobs at Amiens (Somme). PMEs (small and medium-sized enterprises) are comparably affected. At CPM, a family company in Thiers (Puy-de-Dome), where about 100 workers manufacture

installation hardware, they point out that "the situation has rapidly deteriorated. If the current circumstances extend into the first quarter, we will probably have to trim the fat."

Ecia, a Peugeot subsidiary, or the platurgiste [car body clay modeler] Aries have not reached that point yet. But they are having to resort to massive technical unemployment. To avoid this while streamlining production, Dapta-Mallinoud (Puy-de-Dome) is planning for a 15-day vacation period at the end of the year, drawing on 1993. Termoz, specialist in the machining of mechanical parts in Chassieux (Rhône), is also encouraging its salaried employees to use up the balance of their vacation time while cutting back on work hours. Regis Maitenaz, head of Sommer Allibert Industrie, which is the top European upholstery company, acknowledges that "we are working less than 39 hours a week." The company reduced its part-time work force from 400 to 150 between September and November, and what is left may well disappear soon, as is the case with Bendix.

Enterprises are facing the corollary constraint of cutting back on investments. Shrinking self-financing resources have led the Ecia plastics division to cut back its original 1993 investment plan by 20 to 25 percent. The equipment manufacturer states that "we are dipping into facility expenses, the replacement of certain items of equipment is being delayed, and certain cosmetic projects such as office remodelling are being rescheduled." For the time being, research and development budgets have been spared. But if the crisis worsens, the company may also economize on that in order to protect its profitability. Investments have also been postponed at Termoz. Next year they will amount to barely 5 percent of the turnover (compared to 12 percent to 15 percent in 1991 and 1992).

The mood is all the gloomier since manufacturers and equipment makers must maintain their productivity at all costs, notably as a countermeasure to the gradual inroads of Japanese cars on the various South European markets which had been safe until now. This is a gamble for lean years. For suppliers, it will be a harsh shock. Starting in January 1993, French manufacturers will work only with the best among them, those with an A classification. Other constraints are in the offing. PSA wants to hold its suppliers to new productivity increases of 15 percent over the next three years, which has caused widespread grumbling. One machining contractor protests that "manufacturers have asked us for major quality efforts, then they urged us to regroup to achieve critical mass. And now, they're issuing a new proclamation with no other compensation than to remain suppliers. At a time of volume reduction, we will not be able to perform the surges they demand from us." Yet the threat is clear: PSA has already reduced the number of its suppliers from 2,200 to 900 in the past seven years. By 1996, it is expected that there will only be 600 left! Crisis or no crisis, those who don't keep up will be out of luck!

However, in spite of a difficult situation, the French automobile industry is not up against the wall. Structurally, it is even in better health than it was a few years ago. Improvements in quality, tighter schedules and costs which were initiated in the middle of the past decade are beginning to bring results. French products are becoming more and more competitive and attractive, witness the 1992 gains for national manufacturers on the domestic market against imported makes. Renault and PSA will also significantly enhance their lines next year, with the marketing of the Renault Twingo and the new replacement for the R 21, as well as the introduction of the Peugeot 306 and Citroen Xantia. Equipment manufacturers like Valeo, Sommer-Allibert Industrie or Bertrand Faure Automobile, as well as some PME as well, can also nibble at foreign market shares and thereby make up—at least in part—for lower volumes by new contracts. In addition, the steep downturn forecast for the German market will further weaken the competition from beyond the Rhine. France should be in a better position, relatively speaking.

However, automobile industry manufacturers are waiting for the real recovery of the European market, which is expected in 1994. Meanwhile, they are desperately trying to salvage their profitability on markets whose margins are expected to shrink noticeably next year. There are rough times ahead! The price war is getting more critical. To maintain its penetration level, Renault is turning to some markets to introduce models such as the Clio, R 19 or R 21 which are economy versions and therefore less profitable. To achieve savings in such circumstances, automobile industry manufacturers may yet have to apply massive doses of their favorite remedy: lay-offs.

### **French Computer Industry Says Restructuring Necessary**

*93WS0201B Paris L'USINE NOUVELLE in French  
17 Dec 92 pp 16, 17*

[Article by Dominique Commiot: "Restructuring to Adapt to Slower Growth"]

[Text] The turbulence that affected manufacturers is now reaching services, especially since they come to market on each other's heels. Major operators will play the leading roles.

Cap Gemini Sogeti's falling profits, its elimination of 10 percent of its French work force, and the first strikes in its history, all point to the fact that it is computer services which are now unprotected from economic turbulence. This enterprise had weathered previous crises while maintaining its annual growth rate at a steady 14 to 17 percent throughout the 1980s, with admirable margins.

One of the sector's leaders commented that "we are going to have to adapt to a quieter pace of growth." The fact is that computer engineering and services companies (SSII) were registering a growth of 7 to 8 percent in 1992, and that they anticipate a comparable rate for 1993. This adaptation is all the harder since this market, which

remains, in spite of everything, one of the most dynamic, is attracting new and by no means minor players.

In the first place, they are computer manufacturers, struggling with recession in the equipment market. IBM had planned to eliminate 40,000 positions worldwide in 1992; in December, it announced new reductions and an additional 10 to 15 billion French francs [Fr] allocated to restructuring. Bull, for its part, has seen its turnover fall by 11 percent for the first nine months of the year.

In France, manufacturing activity will probably decrease by a total of 2 to 3 percent this year, and the trend will not be reversed in 1993. Microprocessors, workstations, and servers are still selling, but prices are plummeting. And the most profitable niche, that of large machines, is very affected by the stagnation of company computer investments.

IBM and Bull, leaders of the French market, are therefore becoming more and more competitive with SSII. In December 1992, IBM France acquired 100 percent of the capital of Axone, the facilities management specialists, and will turn its internal data management over to that company. Axone will thus be worth Fr1.5 billion. The national manufacturer is planning to follow the same course, and its service operations are growing by 13 percent, or twice as fast as the market.

Manufacturers are not the only ones diversifying into services. France Telecom is emerging as one of the major presences in the field, where it is already achieving a turnover of Fr4 billion through its subsidiary, FTLIS. It has also acquired a 20 percent participation in Sema Group, second most important French SSII, and is negotiating acquisition of shares in Cap Gemini Sogeti capital. The foreign multinationals are also beginning to present something of a threat. AT&T has acquired Dataid; General Motors, through its subsidiary EDS, the leading world SSII, owns GFI and is preparing other acquisitions; as for Daimler Benz, it controls 34 percent of Cap Gemini Sogeti. Even industrial groups like Thomson-CSF are getting into the act.

Syntec-Informatique, the major SSII professional union, anticipates "accelerated restructuring in 1993." French service companies, too focused on developing specific client applications, and not active enough in the most promising fields like facilities management or software program packages, will not escape regroupings.

### **French Mechanical Industry Faces Second Bad Year**

*93WS0201C Paris L'USINE NOUVELLE in French  
17 Dec 92 pp 17, 18*

[Article by Odile Esposito: "More Innovation, Quality, and Export"]

[Text] Affected by monetary upheavals, hurt by the poor health of its clients, the mechanical industry sector is expecting a difficult year. Nevertheless, the enterprises which are holding fast are demonstrating admirable tenacity.



Hubert Perrin, CEO at Mecadyne, says "our visibility is nil for 1993, and we do not expect an upturn before 1994." Mechanics do not believe in Santa Claus, and Perrin's pessimism is shared by the majority of his colleagues. After a very morose 1992, characterized by a 3 percent fall in total production volume, 1993 projections seem hardly more cheerful. The predictable drop of over 10 percent in industrial investments, the persistent crisis in aeronautics and defense, the prognosis of collapse for the automobile industry, the serious depression in agricultural and construction equipment, all threaten to combine once again to inflict hardship on enterprises. Is this too gloomy a picture? The mechanical industry, as we know, is used to managing these cycles. It will gamble in 1993 as it did in 1992, on three major assets: export, quality, and innovation.

No need to hide it: 1993 will be a difficult year, and most enterprises have planned for lower budgets. Henri Giraud, industrial director of Manoir Industries, explains that "in some of our specialties, the level of operations is currently cut in half." This subsidiary of the Strafor Facom group, with a 1.5 billion French franc [Fr] turnover in forging and casting, has a wide range of customers: petrochemistry, aeronautics, automobiles, railroads... But most of these sectors are currently in low gear. Giraud confirms that "for the SNCF, for example, our deliveries for TGV Nord are complete, and there is no project to fill the void. We had already experienced a decrease of this magnitude in 1982-1983." Consequently, Manoir Industries is compressing all expenditures to make up for the 10 percent decrease in revenues announced for 1993.

What is the way out of the doldrums? In 1992, many enterprises survived thanks to exports. Gerard Galois, director general at Maneurop, states that "over the first nine months of the year, our consolidated turnover figure increased by 10 percent. We achieved a growth of 125 percent in Asia and 70 percent in the United States." After a tormented year in 1991, these results brought health back to the refrigerator compressor specialists. Maneurop even increased its manpower by 8 percent in 1992!

Beware, however, of overly hasty enthusiasm! For many firms, the monetary crisis of recent months has amounted to a cold shower. As Perrin says, "the second semester was terrible, because export collapsed. Some countries, like Germany, plunged into crisis, and devaluations did not improve anything. For our subsidiary Selic, for instance, with over half of its Fr270 million in revenues derived from export, the negative impact of these devaluations is estimated at Fr2 million." Jean-Michel Tivoly, CEO of the tooling group of the same name, is a little more optimistic: "This negative impact will only last a few months, because our Italian or Spanish competitors will quickly be forced to pass their increased raw materials costs onto their prices." Meanwhile, you have to hold the fort!

In the face of these market crises, the price war has taken on dramatic proportions. In some specialties, rebates are much higher than 30 or 40 percent. But many mechanical companies have refused to play this suicidal game and have preferred to bet on quality. Giraud explains that "we have specialized each of our plants around high value-added products." Galois adds that "our sales have increased without concessions on prices. Customers respond above all to performance and reliability." Quality and certification constitute the best shield against low price imports. And many enterprises today are lessening the impact of the crisis by quality or certification programs adopted in the years 1989-1990. For the others, it is probably too late...

Concerning investments, mechanical industries cannot evade the rule: those planning to increase their production capacity are rare. Mecadyne, for example, has postponed construction of a new unit for its subsidiary Cryo Diffusion. Giraud explains: "We are trying to maintain an investment level adequate for preserving the operating capabilities, but each expense must rapidly generate savings."

There is caution but also selectivity: Pierre-Yves Legris, head of industrial fluids in the Legris group, says, "in 1993, we will devote 45 percent of our investments to new product development and 15 percent to productivity improvement. In 1991, these proportions were 10 percent for new products and 52 percent for productivity." Many in the mechanical industry are also going for innovation as the only means of disarming the competition hounding them. Maneurop has just started up production of a new compressor design; PPM, subsidiary of the Legris group specialized in mobile cranes, is completely renewing its line. The majority of firms have come to the same conclusion, and the year 1993 should bring a wealth of innovations.

Will all these efforts eventually pay off? Exports will be limited by the depression of some markets, and particularly the German locomotive market. Quality and innovation are costly, and the profits are not immediate. Probably, 1993 will only bring a scant lot of happy news. The industry is getting ready for another year of hardship. And nobody will be likely to accuse it of the sin of optimism!

#### **It Happened in 1992**

Under pressure from automobile manufacturers, the machining sector underwent restructuring: Dapta Mallinjoud took over Matre, and La Clusienne merged with Pernat.

In April, Montupet and Teksid (Fiat subsidiary) announced their merger for aluminum casting. But the projected joint venture was cancelled in October.

Unflappable, the Valois group continued to indulge its acquisition hunger: Europalu and Sofab for castings, Nomel for O-rings, and Billion for plastics injection presses.

A black year for machine tools: layoffs (Huron Graffenstaden, Tornos...), takeover of Rene Clement by Brisard, and Toyoda's relinquishing of Ernault.

### **French Defense Industry Looks to Electronics**

93WS0202A Paris L'USINE NOUVELLE in French  
17 Dec 92 pp 19, 20

[Article by Jean-Francois Jacquier: "Eliminating Overcapacities and Regrouping"]

[Text] It is really the weapons sector that has been stricken for a long time. It is the end of a three-decade golden age begun with General de Gaulle's decision to leave NATO and endow France with an independent nuclear deterrent force. The French industry is organized around 10 or so large groups, either nationalized or directly dependent on the government, or privatized but relying on orders from the military and its research programs. The industry directly employs some 250,000 individuals.

At present, however, all the plants and most of the research departments have overcapacity. Throughout the West manufacturing centers have been impacted by the disappearance of the threat in the East. Moreover, the economic crisis arrived exacerbating the reduction of military budgets. Furthermore, France is faced with the financial impossibility of continuing the costly technological escalation of the weapons. Increasingly it will have to make choices and share development and manufacturing costs with other partners. As a result, at least 130,000 jobs are destined to vanish and others to be reconverted to the civilian sector.

Ground weapons, the first sector to be affected, plan to pare 25,000 individuals by the end of 1994 from a total workforce of 125,000 employees. Giat Industries, manufacturer of the new-generation Leclerc tank (designed to respond to the threat...from the Red Army), therefore will have to struggle to export. Tank orders from the ground force could be cut in half vis-a-vis original estimates.

In military aerospace (30,000 job losses envisioned) Dassault Aviation and its Mirages, engine manufacturer SNECMA, missile manufacturers Matra and Aerospatiale likewise are victims of the reduction in the size of the air force, whose fleet will drop from 450 to only 370 aircraft. Naval shipyards and the strike force show the same trend. The 1992-1994 planning bill provides for scaling down to four instead of six the number of nuclear-missile launching submarines, elimination of the Hades missile, and the postponement or staggering of a good number of other programs.

Many small and medium industries, subcontractors and suppliers of the large principals are in danger of not recovering. And even if they are often opposed to them, such regroupings now appear unavoidable with the project managers. Some industrialists, however, are hoping to benefit, at the end of the decade, from a

recovery due to the implementation of new programs. Such is the case for Dassault's fighter aircraft with the first Rafale deliveries towards 1998 and for helicopters with the launching of the French-German Tiger program being handled by Eurocopter (joint subsidiary of Aerospatiale and Messerschmitt-Boelkow-Blohm GmbH [MBB]). Investment efforts are also aimed in three directions: military reconnaissance and intercept satellites, sophisticated command and communication systems, and, smart weapons. These will be painful changes for some companies, more promising for others, especially those whose activity involves electronics, whose share continues to grow (over 30 percent) in all ongoing programs, followed likewise by the sector for new stealth-associated materials (European Propulsion Company [SEP]) and satellite imagery processing (Fleximage).

In any event, the weapons industry will endeavor as far as possible to develop dual technologies, originating in the civilian sector or usable by it, in order to hold down their development costs and to improve the profitability of their manufacture.

### **Loss of Airbus Orders Affects Subcontractors**

93WS0202B Paris L'USINE NOUVELLE in French  
17 Dec 92 pp 24, 25

[Article by Jean-Francois Jacquier, Jean Botella, Daniel Coue: "Airbus Industrie Forced to Reorganize Its Production"]

[Text] It is a hard blow for Airbus Industrie and its industrial partners! The surprise cancellation of the order for 74 aircraft (50 A-320 and 24 A-340) by the American company Northwest will inevitably be fraught with consequences for all of Europe's civilian aerospace, but most especially so for the French project manager Aerospatiale, engine manufacturer SNECMA and their equipment suppliers and subcontractors.

Commercial policy, production organization, profitability of some programs, new cuts in the workforce, etc.: no matter what those responsible say—and so far they have been extremely guarded on the subject—Northwest's traumatic action bears the seeds of a radical rethinking.

The shock will be all the greater with other massive cancellations feared. For example, Irish leaser GPA, in the throes of serious financial difficulties, has 82 Airbus on order. Besides GPA three large American carriers (see table [not reproduced]) sheltered under the (chapter 11) bankruptcy law are big Airbus customers. Additional sources of concern are Canadian Airlines, Lufthansa and even Air France. For the moment the French company is only discussing a possible rescheduling of its deliveries and according to the board of directors, "cancellation of orders would be only the last solution." Nevertheless, in view of the enormous losses anticipated this year (Fr3 billion), the Economic and Social Development Fund [FDES] quite recently is alleged to have asked the chairman of the French group,

Bernard Attali, to revise downward his investment plan. With business sluggish and struggling to recover its 1990 level after the sudden drop in 1991, overcapacities and liberalization, companies are engaging in suicidal dumping. According to the International Air Transport Association [IATA], more than 1,000 aircraft, that is one-sixth of the international fleet, have been moth-balled in hangars or are rotting in the Arizona desert, unable to be used. The experts are wondering how companies will be able to finance the US\$400 billion they have slated for investment in the purchase of 5,400 aircraft by the end of the century.

In its duel with Boeing and McDonnell Douglas to conquer market shares, Airbus may have gotten hasty. Leasing giants such as GPA or ILFC, that were able to anticipate companies' requirements when the market was upbeat, represent 20 percent of its orders. The European aircraft manufacturer also ventured into precarious financial deals to capture the strategic markets it craved in the United States.

Northwest, for example, whose order (140 aircraft altogether) effectively opened up the American market, was granted an attractive US\$500 million loan by Airbus Industrie. If cancellation of part of the order is confirmed, the first result will be a nearly Fr18 billion loss to be made good. Unquestionably, in terms of numbers, the A-320 program will be the most affected (50 cancellations). But the effects are deemed more serious for the A-340 (24 cancellations). First, because that recent program is just gathering speed and for now does not have more than 100 or so firm orders, which undercuts its credibility. Northwest was one of the launching companies. Although the future of the A-340 is unlikely to be questioned, its profitability will suffer unless a replacement purchaser can be found. For the size of the initial orders is the key to financial success.

However, it is in production that the biggest upsets are expected. According to Aerospatiale, a meeting of the Airbus shareholders (Aerospatiale, DASA, British Aerospace, Casa) is supposed to be held in a few days. At this stage two levels of concern are inescapable: limiting short-term damages and giving the industrial organization greater flexibility over the long term. For a feature of the aerospace industry is the development of especially long cycles, while its customers, subject to abrupt shifts in the economy, are unable to stockpile their product (in this case, seats).

One has to reckon on two and a half to three years, minimum, for the manufacture of an aircraft, starting from the moment the order is signed. At the very outset of the cycle they begin by issuing orders for a supply of raw materials, especially for the aluminum alloy needed to manufacture the airframe, the wings and the undercarriage. Concurrently the customer company selects and orders its jet engines directly from the engine manufacturer; for Northwest, for example, CFM comanufactured by America's General Electric and SNECMA in France. Thereupon various components are ordered

from the suppliers, for instance, the wiring needed to prepare the various sections (wings, tail, cockpit, fuselage elements). Approximately 18 months before delivery those sections go into manufacture on the various assembly lines belonging to Aerospatiale (France), British Airways (England), DASA (Germany) and Casa (Spain). The customer then has to select his avionics (navigation system, on-board computers, etc.) and order them from the equipment suppliers (Sextant Avionique, Honeywell, etc.). Three to four months before delivery, that equipment and the various sections are then forwarded to the final assembly line at Toulouse that will integrate everything and embark on the testing. During this final phase they also undertake the interior appointments of the passenger cabin (installation of seats and customized decoration). Last of all the plane will be painted in the company colors.

Allowing for this organization and since the Airbuses canceled by Northwest were supposed to start being delivered in 1994, the large principals, theoretically, should be the most affected, since the subcontractors and suppliers situated upstream have already completed a sizable part of their work. Hence, Messier-Bugatti, specializing in undercarriages, had no more than two landing-gears to deliver for the Northwest order.

#### A Rate of 150 Aircraft Per Year

In the short term it would actually be in Airbus's interest to try to place the aircraft given up by Northwest with another customer that would replace it on the assembly line. But in the present economic situation that operation is not obvious. Aerospatiale and its associates still have firm orders for nearly 900 aircraft (four years of activity), so the trick for them is going to be evening out production by pushing back upstream the surplus stocks resulting from Northwest.

Consequently, subcontractors are expecting a new cut in the production rates, the third since November 1991. Actually, Airbus Industrie was planning to slow down its production rates to 180 aircraft per year in 1995, instead of the 220 originally slated and it will doubtlessly be forced to stabilize its rate of production at around 150 aircraft per year (currently 160). But that will not be enough. In order to remain effective the organization of the work is in danger of being turned topsy-turvy. The threat of other massive cancellations is also going to push managers to strive for even more flexibility in the process. The transition from automatic steering of production to visual steering calls for the adoption of special rules. That will not be done painlessly. SNECMA has already eliminated 1,150 jobs over three years and is thinking about introducing a new corporate program. Ditto for Messier-Bugatti (2,700 individuals) where new measures could affect 5 percent of the workforce. Among the subcontractors bankruptcy filings are increasing, especially in precision machining. Even worse, if the uncertainty persists, research investments in turn will be threatened. SNECMA is wondering about the timing for the launching of some new programs. Obviously Airbus's

commercial future depends on the way this crisis will be managed while awaiting happier days. The mistake of its managers was perhaps to have gambled on a speedier turnaround in the market.

### **Bull Posts Negative Results in 1992**

*93WS0210A Paris L'USINE NOUVELLE in French  
10 Dec 92 p 26*

[Article by Dominique Commiot: "Bull Falls Prey to Its Own Internal Sluggishness"; first paragraph is L'USINE NOUVELLE introduction]

[Text] Indecision is stymying new commercial opportunities, and government customers are turning away. Yet the national manufacturer has gone to great lengths to restructure itself and holds some of the technologies of the future.

Disappointment is running deep at Bull, where there is little chance that the goal of breaking even again on operating income by year's end will be met. The strategy outlined three years ago by Francis Lorentz, who was Bull's president until last June, is not in question. But its implementation is running smack up against the company's old demons, namely, a preoccupation with in-house problems at the expense of customer satisfaction, bureaucratic sluggishness, and fiefdoms that act as bastions against change.

These are the underlying reasons for Bull's paltry results in 1992. The group's orders and sales have plunged 18 and 11 percent respectively for the first nine months of the year compared to September 1991. Five months after joining the company, new president Bernard Pache notes that, although the economic slump is depressing the performance of all computer manufacturers, Bull is struggling more than its competitors. In France, where the company does 35 percent of its business (33.4 billion French francs [Fr] in 1991), the drop has been held in check, relatively speaking, at -7 percent. That means that in Europe (36 percent of sales) and North America (23 percent), the tumble is much steeper.

The fact that the national computer manufacturer has some strong assets as a result of its restructuring (it closed 8 of its 13 plants and slashed personnel 28 percent in three years) just makes the disappointment that much more acute. Bull's strengths include good products, increased credibility from NEC's and IBM's decision to invest in the company, and some success in the services sector, where Bull has grown 13 percent in France, twice as fast as the market. The group also boasts a technology of the future. Its innovative "distributed computing model" (DCM) will give users great freedom to organize their information systems. Bull is spending Fr14 billion on the concept through 1995. "Bull is ahead of its time with the DCM. Its managers may not understand just

how good it is," said Chuck White, the vice-president of the Gartner Group, in an interview with 01 INFORMATIQUE.

Then why the abysmal losses, which total about Fr2 billion this year, or Fr12 billion over the last three? The recession and the group's debt of Fr11 billion are not wholly to blame. Neither are Bull's difficulties in integrating Zenith Data Systems, which it acquired in 1989. An unbridled price war in the desktop computer market is making ZDS an even bigger deficit producer.

Concerned mainly with hanging on to their power, a certain number of barons at Bull—who have held their positions for years—tend to isolate themselves to hold onto their turf. Such behavior can no longer be tolerated, was the gist of Bernard Pache's message to his managers. But the problem lingers. "There is no electricity in the current organization. We are not aggressive and disciplined," observes Bull France's in-house newspaper.

The group does not react quickly enough for a market that is undergoing wholesale changes. And customers are the first to suffer: orders are not delivered on schedule 50 percent of the time. Zenith Data Systems has been slow to diversify by market and to develop new distribution channels for its line of desktops, as Compaq and IBM successfully did this year.

### **Competitors Not Waiting**

In-house sluggishness is also hamstringing the group's shift into services, one of the rare areas, together with big systems, where Bull makes money. The group plans to diversify into "facilities management," a burgeoning niche. But certain dignitaries who fear in-house competition are putting a spoke in the wheel. The decision to subcontract the group's management computing in house—experience which Bull vitally needs if it wants to tackle the FM market—has still not been made. Meanwhile, competitors are not waiting: IBM France and Thomson-CSF have just taken the plunge.

This indecision does nothing to shore up Bull's image, especially among its government customers. Administrations, long required to buy from Bull, have been shunning the group since public markets were opened up, as if to retaliate against a mandatory—and consequently negligent—supplier. At the end of September, 1992, Bull had written only half the ministry orders targeted in its Plan for the first nine months of the year. It is its sales force's worst performance in France.

The fact has not escaped Bernard Pache. Inside the company, he hammers away incessantly about remobilizing the troops, consistency, collective efficiency, and discipline. Simply choosing the slogan "Bull, a team spirit" did not enable his predecessors to turn the goal into a reality. Five months after his arrival, this is what people are still waiting for the new president to deliver.

**Dassault Electronique 1992 Turnover Up**  
*93WS0253D Paris AFP SCIENCES in French*  
 28 Jan 93 p 14

[Unattributed article: "Dassault Electronique: 3.87 Billion Francs [Fr] in Sales in 1992"]

[Text] Paris—Dassault Electronique, a company specialized in professional and military electronics, achieved sales of Fr3.87 billion in 1992, i.e. 0.3 percent more than in 1991, the group indicated on 26 January.

Dassault Electronique, which termed the figure a "good result," added that it now expects a return to profit in 1993. In October, it had indicated that it was expecting a loss of Fr245 million for 1992.

Orders received last year totalled Fr4.1 billion, compared with Fr3.8 billion in 1991. The parent company's 1992 sales amounted to Fr2.8 billion, and those of the Dassault Automatismes et Telecommunications subsidiary to Fr1.05 billion.

**Siemens Plans Severe Cutbacks for 1993**

*93MI0273 Bonn DIE WELT in German 15 Jan 93 p 14*

[Text] Siemens AG, Germany's largest employer, is going for streamlining. A package of productivity-boosting measures reflects the intention to achieve a sustained improvement in the internal cost situation of the broadly diversified electronics giant (with world sales standing at 78.5 billion German marks [DM] and 413,000 employees.) One of these measures involves further staff reductions within the group.

By the end of the 1992-93 financial year (30 September), the number of Siemens employees worldwide would decrease to "below 400,000," said Heinrich von Pierer, who took office as group chairman in October 1992. In the last financial year alone, 14,000 jobs were lost. Apart from loss-makers Siemens-Nixdorf and the Semiconductor Division, the medical, automation, and private communications systems divisions are also affected by these measures, which are to be implemented "as soon as the social contract will allow," stressed von Pierer.

Both economic and structural setbacks in the world electrical industry are now forcing the Munich-based company to make drastic cuts in the cost structure. After the earlier years of expansion, Siemens now anticipates a period of stagnation. The group order book will probably show 1- or 2-percent growth, to DM87 billion, by the end of 1992-93, with overall sales increasing simultaneously by 7 percent to around DM84 billion, but "enormous efforts" are called for, says von Pierer, to maintain last year's DM1.96-billion surplus.

In the last financial year, 1991-92, Siemens earned more from investments than from its operative business. According to financial executive Karl-Hermann Baumann, financial earnings, i.e., the sum of positive interest, capital gains from securities sales, and trading

results, contributed the lion's share—almost DM2 billion—towards the gross proceeds of DM3.2 billion (DM3.42 billion this year).

The operative proportion of the result primarily showed an accumulated loss of "almost DM1 billion" for Siemens-Nixdorf Information Systems AG and Semiconductors, the two "problem children," said Baumann. Apart from the price decline for memory modules throughout the industry, high startup costs for producing the 16-Mbit chip in France are also responsible for the "considerable loss" in the chips division, probably amounting to around DM600 to DM700 million by now.

American subsidiary Siemens Corporation in New York also reported a DM427.6-million deficit last financial year (DM216.5 million this year). Baumann attributes this negative development firstly to the economic trend-related business losses in the power generation/power stations, automation, and private communications systems divisions, and secondly to the depressive effect on Siemens's American results of the automation business taken over from Texas Instruments.

Von Pierer was reticent as to Siemens's current acquisition plans. While confirming that negotiations were under way with Italian telecommunications manufacturer Italtel, he did not disclose the level of participation that Siemens is seeking. On the negotiations with the Czech mechanical engineering group, Skoda, over the establishment of two joint ventures in "power generation" and "traffic engineering," von Pierer said, "I'm still counting on the negotiations being successful, but I believe that both projects will have to come about."

**German Trust Agency Privatizes Computer Company**

*93MI0302 Bonn DIE WELT 29 Jan 93 p 13*

[Text] The German Trust Agency reported on Tuesday that Computer Electronics Dresden GmbH (Compel) had been privatized. The acquirer is a financial group whose board of directors include Jochen Tschunke, founder of the Munich-based firm Computer 2000, Manfred Schmitt, sole shareholder of Escom Holding AG in Heppenheim, and an attorney from Munich.

According to a press release by the German Trust Agency, this operation has secured 500 jobs. Future activities of the Dresden-based Compel will encompass the production of chassis for personal computers, establishment of a PC service center, and [computer] recycling. Investments worth 20 million German marks [DM] have been budgeted until 1996, while the number of employees should be increased to 700 by 1995. Following Compel's privatization, an additional workforce of 180 has been taken over by the newly established Dresden-based EDP Development and Manufacturing Projects GmbH, a subsidiary of Siemens-Nixdorf AG.

Computer 2000 AG's revenues deriving from the sales of computer equipment have reached DM2 billion. Escom

AG, with revenues of DM800 million, is the second largest German manufacturer and retailer of personal computers. Before German unification, Comped, with a workforce of 2,500, was the only producer of mainframes, minicomputers, and personal computers in the former GDR and in the COMECON area.

Comped is currently the largest company of the former state-owned combine Robotron to have been privatized.

### **Alcatel Opens GaAs Center in Italy**

93MI0311 Turin *MEDIA DUEMILA in Italian*  
Jan 93 p 51

[Text] Milan—Italy ranks second after Japan in GaAs research and production: Alcatel Italia has inaugurated a center in Vimercate (Milan) for the research, development, and production of GaAs electronic components, or semiconductors that are of strategic importance in the telecommunications sector. GaAs electronic components are used in fields where silicon cannot be used ranging from radio transmission, frequencies, and broadband optical systems to cellular telephones.

The new center is located on the Alcatel Telettra site and is the only center with an integrated [production] cycle in the western world to work on this technology: The other GaAs center is in Japan. The center, which cost approximately 50 billion lire to build, currently employs 50 researchers. The components produced there will satisfy the internal market primarily but will also be placed on the foreign market for which a special facility has been created.

The center in Vimercate is nothing but new proof of the strategic role that Alcatel Italia has assigned to research with an annual R&D investment of 240 billion lire amounting to 10 percent of revenues, and 2,300 researchers and technicians working in its laboratories. The new center will work with other Alcatel R&D centers, such as the centers in the same Milan-Vimercate location (transmission, packet switching networks, broadband communications), in Salerno-Battipaglia (public networks, commutation, mobile communications, voice processing), and in Florence (broadband networks, cable systems, multimedia and transport systems).

The inauguration of the new research center also represented an opportunity to present the principal strategies of Alcatel Italia's activities. In 1991, the company's overall revenues amounted to 2.4 trillion lire with a workforce of 15,500, while for the same year the French multinational company Alcatel, of which Alcatel Italia is an associated company, registered 35.4 trillion lire equivalent in revenues with a workforce of 134,000.

"We hope to achieve this result during the current year," said Alcatel Italia Managing Director Domenico Ferraro.

Alcatel Italia's projects for the immediate future include its participation in the pan-European GSM [Special Mobile Group] cellular telephone project recently

launched by SIP [Italian State-Owned Telephone Company]. The system is currently being tested on the Turin-Venice and Milan-Naples highways. Alcatel Italia hopes to supply the radio base stations to be installed soon. Approximately 80 percent of the national territory is still not covered by radio base stations for the GSM system, which represents a significant area of the country. "And," said Domenico Ferraro, "because our relations with SIP are more than good," Alcatel Italia is candidating itself as a supplier of the BTS radio base station systems for the IBM network in Italy.

Another important challenge for Alcatel is the evolution of the current telephone network into a broadband network. The high-speed communications and signal transmission made possible by the digital technologies used in broadband (ATM [anti-transmit-receive] and SDH [synchronous data handling]) networks will allow for multimedia systems.

### **French Microelectronics Managers Assess Single Market Effects on Trade**

93BR0362 Paris *ELECTRONIQUE INTERNATIONALE*  
*HEBDO in French* 14 Jan 93 p 6

[Text] Both Jacques Bouyer, president of the Association of Electronics Industries (GIEL), and Yvon Gattaz, president of Youth and Industry and chairman and managing director of Radiall, think that the opening of the frontiers on 1 January 1993 will simplify logistics and decrease exchange procedure costs, at the risk of further weakening the European electronics industry.

"Electronics has for a long time now been a sector which operates on a worldwide basis and consequently made ample provisions for 1993 and the opening of European frontiers," stated Yvon Gattaz, an Institute member, president of Youth and Industry, chairman and managing director of Radiall, and honorary president of the CNPF [National French Employers Organization]. Even Jacques Bouyer, GIEL president and chairman of Philips Composants, made the same observation: "The market, too, is of a worldwide and therefore European scale. The opening of the frontiers will therefore not act as a catalyst to help electronic products penetrate the markets." However, Yvon Gattaz was of the opinion that "opening the frontiers would speed up the process of the opening of national government procurement markets."

Both Jacques Bouyer and Yvon Gattaz see positive effects in the simplification of trade procedures. According to Jacques Bouyer, "The expected reduction in administrative costs would, in view of the present growth rate of electronic industries, have considerable effects." Cost reductions could reach 5 percent if the single currency was in use. For Yvon Gattaz, "Intra-European logistics might be simplified which could be an advantage to manufacturers and especially distributors who are busy merging and reorganizing to achieve a 'European size.' Distribution will also play a role in harmonizing sales prices in the various countries, leading to a European market price."

The two chairmen think that another positive effect would be that citizens' awareness of European reality would increase. "Up to now, the economic awareness within the Community has been rather low and European consumers can often be seen to prefer one or the other American or Japanese product to a genuinely European product of the same performance and price. Europeans have yet to acquire this very strong loyalty that the Japanese have for their own products," stated Yvon Gattaz, rather prudently.

#### **Be Careful of a Weakening Europe**

Nevertheless, the danger of a weak Europe is not excluded by the GIEL president, who senses that there are two problems, that is, "First, that the removal of national restrictive quota, with no EC rules to take their place, will give rise to an atmosphere of uncertainty detrimental to the EC; for example, Italy has just decided by itself its own quotas for imported foreign cars, etc. Second, that the attractiveness of the European market will inspire foreign investors, including Asians, to make unjustifiably high investments in European countries, and this even with EC aid. I am not against aid in areas not covered by European industries, but I deplore the setting up of a Korean TV-tube production line in Lorraine and Samsung establishing itself in East Berlin, etc."

Yvon Gattaz also expressed concern for subcontractors of large groups faced with the changing economic scene: "This opening of the frontiers is important because it makes people aware of Europe as a complete entity and not a loose configuration of national markets. But there is a danger that Americans and Japanese will become more rapidly and more acutely aware of this than the Europeans themselves. Consequently, the large groups are reorganizing and redistributing their decision centers, sometimes causing sudden changes which could be unfavorable to their regional suppliers."

#### **Is Europe the Victim of the GATT Agreement?**

Jacques Bouyer expressed considerable concern about the way in which the GATT (General Agreement on Tariffs and Trade) customs tariff question was resolved, and did not hesitate to describe Europe's attitude in these agreements as being "criminally inconsistent," and called them "bad agreements for the manufacturing industry." The president denounced for instance the willingness of the Europeans to play their opponents' game: "We must take our time," he exclaimed. All the more so since, in his opinion, the United States is at present showing an increased will to win and the Japanese have a growth crisis and, by consequence, the aggressiveness of both these two protagonists has increased and is all the more marked with a weakened Europe. "Instead of criticizing the United States for being armed with the Super 301 list, Europe should have an equivalent weapon that it could use if need be," declared Jacques Bouyer and added: "When the opponent has heavy artillery, it is difficult to make do with machine guns."

#### **Austria: Electronics Trade Association Favors EC Membership**

*93BR0363 Paris ELECTRONIQUE INTERNATIONAL HEBDO in French 14 Jan 93 p 7*

[Text] The manufacturers in European countries that are not members of the EC wish to enter the Common Market, if only to reduce their export duties. This is particularly the case in Austria.

According to the Austrian Electronic Industry Trade Association (FEEI), the 2.7-percent drop in domestic production of electronic components and systems and the 3.2-percent drop in exports during the first six months of 1992 are partly due to a 4-percent reduction in orders from abroad. One of the reasons for this is the 6.5-percent customs duty on goods exported to the EC, which makes up three-quarters of the country's total exports (25 billion French francs [Fr]). A survey carried out among the Association's 300 members showed them clearly in favor of joining the EC, which would facilitate trade, as well as access to invitations to tender and to European R&D programs, not to mention the advantages from using the same standards and regulations. The very export-oriented Austrian electronics industry in fact suffers from a lack of free trade agreements like those in existence between the EC and the eastern European countries. For example, a German company in Hungary can import its passive components and manufactured or assembled cables into the EC without paying customs duties, whereas an Austrian company finds itself obliged to pay a tax of 6.5 percent.

#### **New Capital Structure of SGS-Thomson Explained**

*93BR0365 Paris ELECTRONIQUE INTERNATIONAL HEBDO in French 14 Jan 93 p 8*

[Text] On the occasion of the announcement of the signing of the agreement with Thomson-CSF finalizing the restructuring of the French shareholding of SGS-Thomson, Jean-Claude Hirel, CEA [Atomic Energy Commission] Industrie president, came down in favor of cooperation between SGS-Thomson and Siemens. He thus declared himself determined "to spare no effort" in reaching a technology cooperation agreement similar to that signed with Philips at the end of 1991. On the French side, the deal is now settled; it remains for the Italians to do the same so that the first half of the \$1 billion slated is paid to SGS-Thomson. This should be done before the end of the month.

The French shareholders of a company called SGS-Thomson Holding NV, which represents French and Italian interests and which holds between 90 and 95 percent of SGS-Thomson NV, depending on whether Thorn EMI does or does not follow the increase in



capital, have been grouped together in the FT2CI holding company, 49.9 percent of which is held by Thomson-CSF and 50.1 percent by another holding company called FT1CI. Of the latter, 49.9 percent is held by France Telecom and 50.1 percent by CEA Industrie. The agreement signed on 6 January has a clause allowing Thomson-CSF to completely opt out of SGS-Thomson at the end of 1996 for an assessment price that will depend on the latter's net balance at that date. CEA Industrie will, for its part, have the possibility to buy up its shares.

#### **France: Activities of Microwave IC Manufacturers Noted**

*93BR0368 Paris ELECTRONIQUE INTERNATIONAL  
HEBDO in French 14 Jan 93 pp 21-22*

[Article signed R.G.: "Custom-Made Microwave Integrated Circuits (MMICs): Supply Exceeds Demand"]

[Text] Slowly but surely, the ASIC [application-specific integrated circuit] concept is gaining acceptance in microwave technology; supply in custom-made microwave integrated circuits is expanding, although demand remains rather limited.

Supply in microwave integrated circuits, or MMICs [monolithic microwave integrated circuits], is not limited to standard circuits for applications such as satellite-to-television receivers, pan-European digital mobile telephones, or other mobile or portable communications systems. Some French firms also offer custom-designed gallium arsenide [GaAs] MMIC's services. Such services range from simple wafer foundry manufacture based on photomask pattern generators provided by users, to production of complete circuits and systems based on user specifications.

Two French manufacturers—Philips Microwave Limeil (PML) and Thomson-CSF Semiconducteurs Specifiques—share the French market with a number of American firms either directly present in France or using representatives or distributors, including Litton Solid State (Litton Precision Products), Triquint (Tekelec), MA/Com, Raytheon (Micro Gisco), Harris Microwave Semiconductor (Omega Technologies), GEC Marconi (JAC International), and Motorola. Oddly enough, in spite of their rather enviable position with respect to discrete devices, the Japanese are absent from the field of custom-made MMICs.

PML and Thomson do more than the competition inasmuch as they offer development services in addition to their manufacturing services. As for Dassault Electronique, although the firm has no production facilities, it has GaAs MMIC design capability for MESFETs [metal semiconductor field effect transistors], HEMTs [high-electron mobility transistors], or even HBTs [heterojunction bipolar transistors], which are made by specialized European or American foundries. Circuits developed by Dassault so far include a power amplifier chip yielding 27 dBm at 1-dB compression in band 2 (18 GHz) and an

amplifier with noise level lower than 4 dB and gain exceeding 33 dB in the Ku (14 to 14.5 GHz) band.

Dassault Electronique also offers microwave CAD [computer-aided design] and wafer testing services, as well as packaging or manufacture of entire subassemblies.

#### **0.2-Micron HEMT Technology in Final Development Stage**

As for Thomson-CSF Semiconducteurs Specifiques, together with Paris-Sud University and Hewlett-Packard, it has been offering GaAs microwave and millimeter IC design and characterization training courses. Foundry technologies available in the company's Saint-Egreve plant [near Grenoble] are not only relevant for specific microwave ICs (0.5-micron low noise circuits and 0.7-micron power circuits), but also encompass specific digital ICs through an agreement with the American firm Vitesse Semiconductor.

As for Philips Microwave Limeil, it has been using 0.7-micron and 0.5-micron grid length technologies. Such technologies make it possible to manufacture MMICs with frequencies exceeding 24 GHz, while a 0.2-micron grid length HEMT technology is now in its final development stage for applications in the millimeter wavelengths range.

#### **French Report Analyzes EC Microelectronics Trade Deficit**

*93BR0370 Paris ELECTRONIQUE INTERNATIONAL  
HEBDO in French 14 Jan 93 pp 32-33*

[Article by Didier Girault: "European Electronics Beating Its Wings"]

[Text] While Southeast Asian countries keep gaining ground, Europe is falling behind in a depressed worldwide electronics market. According to an annual report published by the BIPE [Economic Forecasting and Information Bureau] with EIC (Electronics International Corporation) and FCC (Counseling and Communications Financier), by the beginning of 1997 Europe's electronics trade deficit will reach some \$60 billion.... (Report is entitled "L'Electronique dans le Monde" [Worldwide Electronics Survey]; available from BIPE (Issy-les-Moulineaux), tel. 46.62.33.00.)

The international electronics industry, which makes up more than 5 percent of the world's GDP with estimated production figures of more than \$1,000 billion for 1992, has experienced slower growth last year—4.2 percent as compared to 7 percent in 1991, according to a joint survey by BIPE Conseil, EIC, and FCC.

In such a context, Europe's position is cause for alarm as its trade deficit with the rest of the world has been steadily increasing. This deficit is expected to reach \$60 billion in 1997, as compared to \$45.8 billion in 1992, mostly due to the deteriorating position of the Old World in computers (\$21 billion deficit in 1991) and



consumer electronics (\$15 billion deficit in 1991). While the United States is making headway with respect to active components (including tubes, optoelectronic components, and semiconductors, according to survey nomenclature), Europe is increasingly lagging in this market, which was worth an estimated \$85 billion in 1991 (with approximately \$64 billion for semiconductors). The survey authors expect it to soar to \$150 billion in 1997, with the share of semiconductors exceeding \$120 billion. (Projections based on \$1 = ECU1, with a hypothetical 3-percent annual inflation rate.)

### Rise of Southeast Asian Countries

European firms controlled no more than 12 percent of the world production aimed at the free market in 1991 (and less than 10 percent for semiconductors), as compared to 14 percent in 1990. In 1991, Japanese firms grabbed 49 percent, while 31 percent originated with American firms and 6 percent with Southeast Asian companies. European companies can then no longer see themselves as generalists unless they enter into alliances with a world leader in semiconductors, according to J.-P. Berthier, FCC executive director.

In the active components sector, geographic zone analysis shows that Europe's trade deficit remains on the increase; it should rise to almost \$8 billion in 1997, from \$5.4 billion in 1991, whereas the United States will exert better control on its own deficit, which should only go from \$2.3 billion in 1991 to \$3.8 billion in 1997.

While Japan's exports are leveling off (more and more exports come from its foreign subsidiaries) and its production is dropping (about 5 percent in yen in 1992), the United States has increased production by 5 percent through growth in the computer sector in late 1992; and while European production is stagnating (+ 0.1 percent in ECUs), Southeast Asian countries (South Korea, Hong Kong, Indonesia, Malaysia, Philippines, Singapore, Taiwan, and Thailand) have been enjoying a production increase of about 8 percent in 1992. Although this Asian electronics production (\$85 billion in 1992) makes up no more than about 8 to 9 percent of world production, it is gaining the upper hand in sectors such as consumer electronics (audio products, television sets, tubes, and receivers), computers (peripherals and microcomputers), as well as memories. According to the

survey, "their growth pattern mimics that of Japan in the 1960s and 1970s," the difference being that production does not come exclusively from local companies. About half of the production originating from Southeast Asia is controlled by foreign conglomerates (compared with 6 percent in Japan, 9 percent in the United States, and 27 percent in Europe). Therefore, Asian companies (Japan excluded) control less than 5 percent of global production. The Southeast Asian countries' trade surplus for the whole electronics sector was worth \$17.9 billion in 1991 (including \$9 billion for consumer products and \$14.1 for computers); it could exceed \$29 billion in 1997. These countries can, therefore, be said to be in an excellent position, especially if one looks at that of the Old World: a deficit of \$46 billion in 1991 and more than \$60 billion in 1997.... For experts who prepared the survey, "this (Europe's) decline is so great that one is led to wondering whether the point of no return might not have been reached in some of these fields (consumer products, computers, components...). Europe is not aware of the threat its electronics industry is confronted with and, because it must reconcile national policies inspired by conflicting, albeit often legitimate interests, it has proved incapable or unwilling to take a clear stand. This indecision brings with it dire consequences."

### [Box, p 33]

### Computers: Growth in Services and Slowdown in Hardware

"Growth in the global information technology market should be about 7 percent a year in current dollars until 1997, with the market figure climbing from \$227 billion to \$343 billion (\$1 = ECU1 = 168 yen)," according to the BIPE Conseil-EIC-FCC survey. The survey highlights growth in services for computer makers up to an estimated 36 percent of global activity in the field in 1997 (as compared to 21 percent in 1991), as well as a slowdown for hardware, whose average growth would not exceed 5 percent before 1997.

Japan is the clear winner of the information technology race, with surpluses of about \$15 billion in 1991, while Europe registered a deficit of more than \$20 billion that same year. Southeast Asia, which concentrated on peripheral and microcomputer production, performed remarkably well; in total, its surpluses with the United States and Europe reached almost \$16 billion in 1991.

**Production Control in Each Area in 1991 (European, American, and Japanese firms)**

	Japanese Market	U.S Market	European Market
Total Production	\$253,180 million	\$336,290 million	\$238,870 million
Japan	94 percent	4 percent	6 percent
United States	6 percent	91 percent	21 percent
Europe	0 percent	4 percent	73 percent

In Europe, U.S. firms hold 21 percent of electronics production. Although it has been increasing, contribution of Japanese firms to European and U.S. production remains limited (respectively 6 percent and 4 percent, as compared to 5 percent and 3 percent in 1989).

(Studio Groupe TESTS/Source BIPE Conseil/EIC/FCC)

**World Electronics Industry in 1992 (by sectors)**

Medical	2%
Measurements	5%
Passive components	7%
Active components	9%
Consumer electronics	9%
Office automation	3%
Software and Services	18%
Computers	23%
Factory automation	5%
Telecommunications	9%
Professional hardware	10%

Global production in 1992: \$1,013 billion

The computer sector (hardware and software) makes up 41 percent of the global electronics sector, as compared to 27 percent in 1980. Consumer products industries have seen their share drop from 14 percent in 1980 to 9 percent in 1992.

**Trade Balance Changes in the Electronics Sector (in millions of current dollars)**

	1979	1984	1989	1990	1991	1997(*)
Europe	-1,500	-12,220	-34,000	-41,510	-45,840	-60,200
United States	4,300	-1,200	-7,700	-1,960	-4,530	-10,700
Japan	13,200	35,500	62,700	64,240	70,670	91,400
Southeast Asia	-16,000	-22,100	-20,800	17,130	17,940	29,100
Rest of the world			-37,900	-38,240	-49,600	

(\*)1997 figures based on trend projection with a hypothetical return to 1986 exchange rates (\$1 = ECU1), and excluding both large production transfers and strict protectionist measures (border closures, new quotas, substantial customs duties increases...). Source: BIPE Conseil/EIC/FCC

Japan's trade surplus is expected to increase (\$91 billion in 1997), to the detriment of every other geographic area with the exception of Southeast Asian countries (\$29 billion surplus in 1997).

**CEA-Industrie Director on SGS-Thomson's Strategy**  
93BR0377 Paris *ELECTRONIQUE INTERNATIONAL*  
HEBDO in French 21 Jan 93 p 9

[Interview with Jean-Claude Hirel, chief executive officer of CEA-Industrie, by Jean-Pierre Della Mussia: "Just Balancing the Books Is Not Enough for SGS-Thomson"]

[Text] Jean-Claude Hirel, chief executive officer (CEO) of CEA [Atomic Energy Commission]-Industrie, has become the representative of SGS-Thomson's French shareholders as part of the new financial arrangement requested by the public authorities. He replied to our questions.

**ELECTRONIQUE INTERNATIONAL HEBDO**  
[EIH]: Does CEA-Industrie have any industrial ambitions in terms of electronic components?

**Hirel:** I have only been head of CEA-Industrie for four months, and it is too early to announce a CEA-Industrie components policy. It is certain that CEA-Industrie is involved in this sector through Pixel International (active matrix flat panel displays), Sofradir (infrared detectors), Framatome (connectors), and SGS-Thomson

(semiconductors). Moreover, through CEA, it has a very competent research laboratory in this field, the LETI [Electronics and Computer Technology Laboratory].

Leaving aside these observations and turning to the future, CEA-Industrie does actually wish to invest in components; but only in innovative components or in innovative electronics in general.

**EIH:** You recently spoke of a possible refocusing of SGS-Thomson's activities. Can you be more specific?

**Hirel:** A company only makes good progress when it is making profits. Breaking even is not enough.

For this, SGS-Thomson will thus have to discontinue activities which are not sufficiently profitable.

**EIH:** Who will decide?

**Hirel:** I have great confidence in Pasquale Pistorio, who heads SGS-Thomson. It is he who will continue to decide on its product policy. It is he who will suggest development plans which should result in X percent profitability in Y years' time. We will simply decide on these figures in cooperation with the Italian shareholders and in accordance with the ambitiousness of the plans proposed to us.

**EIH:** You recently stated that you would not like to see new customer-partners buy into the capital of SGS-Thomson. Why are you then so keen that Thorn EMI and Thomson should stay in?

**Hirel:** I did not say that I did not want there to be any new shareholders. I said that I did not believe it would happen; users want to be free and to diversify their sources. Buying into the capital of one of their suppliers does not solve their problems. On the other hand, I believe in long-term contracts and in the use of joint resources. However, if users wished to buy into the capital of SGS-Thomson, there would be no objection. Moreover, we do not rule out the possibility that partners might buy in by contributing a semiconductor activity, as Thorn-EMI did with Inmos.

**EIH:** It has been said more than once that you wanted "to go all out" to bring SGS-Thomson and Siemens closer together. What about other companies?

**Hirel:** There is no exclusive arrangement, neither with IBM nor even with other German partners. But for me, an agreement is an act of love. You must like each other. There must be free will.

For example, we are very satisfied with our agreement with Philips with respect to our joint activity in Crolles.

**EIH:** The way you talk suggests that you consider LETI to be a laboratory run by CEA-Industrie and that it will obviously help SGS-Thomson. But in fact it is a laboratory of CEA, your parent company. Is there not a difference in practice?

**Hirel:** If CEA agreed to CEA-Industrie buying into the capital of SGS-Thomson, it was because it believes that semiconductors are important. All those involved in electronics at CEA and CEA-Industrie have known each other for a long time. The idea of a disagreement between CEA and CEA-Industrie has therefore never even crossed my mind. It should not be forgotten that we are the "overflow tank" for CEA's research laboratories.

[box]

#### **SGS-Thomson Grew More Than the World Market in 1992**

SGS-Thomson's 1992 sales figure grew 12 percent, i.e., a higher growth rate than both that of the European market (11 percent) and the world market (9.8 percent). According to Dataquest, the company still ranks 13th worldwide among semiconductor manufacturers, but it has moved from 14th to 13th place in integrated circuits and from ninth to eighth place in discrete semiconductors (and even from fifth to fourth place just for its specific range of discrete circuits—it does not manufacture optoelectronic devices, for example). This growth rate has enabled it to exceed \$1,600 million in revenues and to balance the books.

It should be noted that, in the Dataquest ratings, Philips moves from 10th place worldwide to ninth (4-percent

increase in revenues) thanks to Matsushita's weak showing (-5 percent), and that Siemens falls from 16th place to 17th (-3 percent).

SGS-Thomson now makes 55 percent of its sales in Europe, 22 percent in the United States, 20 percent in Asia, and 3 percent in Japan. In 1992, the structure of its sales by product was apparently the following: Dedicated circuits and ASICs [application-specific integrated circuits]: 44 percent; discrete semiconductors: 21 percent; memories: 19 percent; microprocessors: 10 percent; standard ICs: 6 percent.

It should be specified that SGS-Thomson holds 14.5 percent of the world market for EPROMs [erasable programmable read only memories] (ranking third worldwide) and 18.4 percent of the power integrated circuits markets (ranking first in the world).

#### **Siemens Seeks Partnerships in Application-Specific Circuits**

93BR0378 Paris *ELECTRONIQUE INTERNATIONALE*  
HEBDO in French 21 Jan 93 p 10

[Article signed E.F.: "Siemens Calls for European Cooperation in Application-Specific Integrated Circuits (ASICs)"]

[Text] Munich—Siemens is going to increase its productivity and strengthen cooperation in order to curb further losses in its semiconductors division.

Against the background of the worldwide recession, the German group Siemens has still managed to do well, with an overall sales figure of Fr275 billion (up 8 percent) and net profits up 9 percent to nearly Fr7 billion for its last fiscal year, ending 30 September. Orders have only increased by 4 percent to approximately Fr300 billion. Although the computer division has succeeded in increasing its sales by 7 percent and reducing its losses by more than 30 percent, the same cannot be said of semiconductors, where—the group is no more specific than this—"losses have further increased compared to the preceding year." Semiconductor sales have thus fallen by 7 percent, to Fr6.6 billion, while orders have fallen by 5 percent to around Fr7 billion. Sales and orders have also dropped in passive components (at MEC [Matsushita Electronics Corporation], a subsidiary jointly owned by Matsushita) by 6 percent and 10 percent respectively, to Fr5.25 billion. Electromechanical components sales have increased by 3 percent.

#### **No Recovery Expected in 1993**

Semiconductor losses should, however, decrease this year: Production sites are being rationalized, mainly through layoffs and productivity increases. Although electronic components are not among Siemens's key divisions—these are energy technology, industrial energy applications, communications, and data processing—they nevertheless remain very important to the group in that they are linked to these sectors by the strategic

nature of their technological know-how. On this latter point, Heinrich von Pierer, chairman of Siemens since last October, specified that: "Siemens is not lagging behind Japan in technological terms. Our alliances ensure continuity in this sector until the next millennium, but we are also open to new alliances. I see possibilities in the ASIC [application-specific integrated circuit] sector. Greater cooperation with European companies is desirable, mainly for reasons of independence."

Commenting on the results of the first quarter of the 1992-1993 fiscal year (sales up by 4 percent, but orders down 8 percent), Heinrich von Pierer was very reserved in his forecasts for 1993, expecting Fr294 billion in sales and a 1- to 2-percent increase in orders, while hoping that profits will be maintained. The most buoyant sectors will be telecommunications (particularly public), energy technologies, and transport, as during last year when these Siemens branches stood out with respective sales increases of 17 percent, 33 percent, and 27 percent.

#### **France: 1993 Projections for Electronics Components Market Reported**

*93BR0395 Paris ELECTRONIQUE INTERNATIONALE  
HEBDO in French 28 Jan 93 pp 1,8*

[Article by Francois Grosvalet with Jean-Charles Guezel, Florence Ladouce, Laurence Mizrahi: "A Good Year for Components at Hand"]

[Text] While they are not overly optimistic, French electronics suppliers have no reason to be pessimistic: 1993 will be a normal year, or even a good one if telecommunications are up to it.

Ultimately, 1993 could go down in history as a good year for all French electronics suppliers. Most observers expect 8- to 10-percent growth in the semiconductors market (in French francs [Fr]), after a mere 5 to 6 percent in 1992. This relative optimism is shared by connector manufacturers: Despite a 5-percent drop in sales in 1992, FCI [Framatome Connectors International] is expecting growth in 1993, while Molex is counting on a 15-percent increase in France. However, distributors are talking about growth of 5 to 6 percent at best. Manufacturers of printed circuits and other passive components are not any more optimistic. Philippe Georgiadis, sales manager at Philips Circuits Imprimées [printed circuits], is predicting a good first half, but a rather poor second half.

The latest estimates from the French semiconductor manufacturers' association, which comprises most of the suppliers active in France, report a French market worth Fr7.6 billion in 1992 (\$1.45 billion for Motorola). In this sector, the book-to-bill ratios are at the same level in France as in the rest of Europe: 1.03 in December 1992. They also exceed one for connectors (with an increase in three-month orders), printed circuits, and other passive components. In the latter area, they reached 1.4 in December and should stay at this level in January and February, according to Michel Blanchard, manager of the passive components and magnetic products division

at Philips. Nevertheless, he would prefer to wait until he sees February's figures before making any pronouncements for 1993.

#### **Telecommunications and Automotive Sectors Are Driving Force Behind Components**

While, in terms of application sectors, automobiles and information technology were the driving force behind the French market in 1992, 1993 will more likely be the year of telecommunications and automobiles.

Daniel Hoste, sales and marketing manager at Motorola Semiconductors for France and the Benelux countries, expects that semiconductors sales in the automotive sector, which saw 25-percent growth in 1992, will increase by another 10 percent this year, while Philippe Georgiadis also expects growth in printed circuit sales. Unfortunately, however, the automotive sector still represents only 8.5 percent of semiconductor sales in France.

For Hoste, the automotive market growth in 1993 will be the result of not so much the increase in automobile sales (in fact, car registrations have been forecast to drop), but of the laws that now require electronic injection in all models, thus helping to increase the electronic content of cars. This is what Jean-Philippe Dauvin, director of strategic studies at SGS-Thomson, calls a double pervasion: not only is there an increase in the electronic content of automobiles, but the components used are increasingly sophisticated. Thus, the 4-bit microcontrollers are gradually being replaced by 8-bit, 16-bit, or even 32-bit versions. And if one goes by what FCI says, the automotive connectors sector is growing faster than other connector sectors (growth on the order of 10 percent is predicted for this year).

Components sales in the telecommunications markets, which grew 5 percent in 1992, should grow further in 1993 (Georgiadis even predicts 15-percent growth in the early part of the year). Telecommunications should "move" well in 1993, because "the GSM [Global System for Mobile Communications] is getting off the ground," says Hoste. His opinion is shared by Mr. Richard, manager of Murata France, even though this has not yet had major repercussions on component sales, as MIETEC [Microelectronics Technology] CEO Jean-Pierre Liebaut points out. New phone sets, either wired or wireless, should also contribute toward sustaining the increased use of semiconductors in telecommunications.

As far as information technology is concerned, component manufacturers are not all in agreement. For D. Hoste, this is an artificial phenomenon linked to the importation of a great number of virgin cards by Taiwanese PC makers, who prefer to assemble their machines in France and, if necessary, insert the most critical components on the final consumers' market. This is implicitly confirmed by Georgiadis, who acknowledged a 20-percent drop in sales of printed circuits for computers manufactured in France compared to the same period in 1992.

The consumer electronics sector is growing very slightly. This should pick up in 1993 because television manufacturing operations gained momentum last November, according to Blanchard. This assertion is not shared by his colleague, Georgiadis, who predicts a 10-percent drop in sales of printed circuits for consumer electronics at the beginning of the year.

The industrial sector will stagnate or rise slightly. The military sector will continue its slow downturn, although FCI received more orders in the last quarter of 1992 than in the same period in 1991.

Memories, microprocessors, and associated circuits (peripheral circuits, microcontrollers, etc.) are driving the French and European semiconductor markets. In the third quarter of 1992 alone (according to the latest figures from SITELESC [Electronic Tubes and Semiconductors Trade Association]; final figures for 1992 will not be available until mid-February), DRAMs [dynamic random access memories] were up 21 percent and microprocessors were up 24 percent. As always, price plays an important role in up- or downward fluctuation in microprocessor and memory sales. After major reductions, DRAM prices have now been redirected upwards. OEM [original equipment manufacturer] prices for 4-Mbit DRAMs have risen 12 to 15 percent since last November. (The price on the parallel market, however, has exploded because it is linked directly to the concept of supply and demand.) DRAM manufacturers work by allotments, but "the shortage could be at least partly reduced when the Korean problem is solved," says Chabane Moula, manager of the French subsidiary of Fujitsu Microelectronics, who explains the DRAM shortage both in terms of renewal of the total number of installed PCs and the arrival of operating systems on the market with increasingly higher dynamic memory requirements. Moreover, the DRAM shortage does not affect just simple memories, but also modules. This is because, as Dauvin points out, the DRAM market is a mature market that gives rise to all sorts of products, including modules, which are currently pulling the market along. There does not seem to be any particular tension about other types of electronic components, whose prices follow conventional learning curves.

#### 1994: Caution, Danger Ahead!

According to Dauvin, this double pervasion, both technological (the case of PCs with the shift to more powerful models) and real (as in household electrical appliances), affects all sectors of industry, which is encouraging for the future. Thus, he says, "the continual penetration of electronics is a sign of good years ahead, when the economies pick up again," something that should not take long. As Fred Shlapak, assistant general manager of Motorola Semiconductors Europe, says: "Although it is true that 1.2-percent growth of the French GNP is not very much compared to previous forecasts, it is still better than the 0.5 percent in real growth we saw in 1992. This opens up a whole range of prospects."

For semiconductors, there is a long-term risk of an acceleration in the demand in terms of numbers of parts made on downsized production capacity. It should not be forgotten that investments in semiconductors only went up 10 to 12 percent over the past two years. Even if they pick up again in 1993 (which is the Americans' aim), it will be too late for next year. 1994, which will suffer due to 1992 under-investment, may well be the year of living dangerously.

#### Structure of the French Semiconductor Market per User Sector (constant dollars)

	1992	1997
Communications	21.3%	22%
Information technology and PCs	17.8%	17.5%
Distribution	19.9%	20%
Industrial	6.6%	6.5%
Military and space	7.3%	6%
Automotive	8.9%	9.5%
Consumer electronics	18.2%	18.5%
Total	\$1,450 million	\$2,000 million

Annual average growth in French francs: 9.1%

Motorola expects the French semiconductor market, which was worth Fr7.6 billion in 1992 according to SITELESC estimates, to grow by 9.1 percent annually between now and 1997.

#### Belgian Mietec Starts Up Submicron Production Line

93BR0397 Paris *ELECTRONIQUE INTERNATIONALE*  
HEBDO in French 28 Jan 93 p 12

[Article signed F.G.: "Mietec's Submicron Unit Is Ready"]

[Text] The first circuits have emerged from the production lines of Mietec's second plant in Belgium. As planned, mass production will start in the second quarter of 1993.

Sixteen months after work began, the first CMOS [complementary metal-oxide semiconductor] submicron technology circuits have been produced in Mietec's second production plant at Oudenaarde in Belgium. The first plant, adjacent to it, will gradually specialize in the production of high-voltage CMOS and BiCMOS [bipolar CMOS] technology. As planned, mass production should start in the second quarter following an investment of ECU85 million (approximately 565 million Belgian francs [BFR]).

This investment should allow Mietec, which sells 70 percent of its output to the Alcatel group, of which it is a subsidiary, to consolidate its position on the European market for specific circuits. According to the most recent Dataquest ranking published in December 1992, Mietec is currently the first manufacturer in Europe of application-specific linear and mixed analog-digital circuits and standard cell CMOS circuits.

In application specific circuits as a whole, it ranks third in Europe after GEC Plessey Semiconductors and LSI Logic.

After relatively modest 1992 results (corporate revenues are expected to grow by 10 percent to \$115 million, compared to a growth rate of 20 percent in 1991), Mitec is expecting 1993 to be a good year. "Even if the boom period is over, the market is not too bad, at least in certain sectors and particularly in the telecommunications sector," explained Jean-Pierre Liebaut, president and CEO at Mitec.

The health of the telecommunications sector, the main outlet for Mitec products, is mainly dependent on infrastructure spending by developing countries. As for GSM [Global System for Mobile Communications], Mitec is not yet feeling its impact at the level of component sales.

## EAST-WEST RELATIONS

### Franco-Russian Space Program Outlined

93WS0225A Paris AFP SCIENCES in French  
30 Dec 92 pp 3, 4

[Article: "Franco-Russian Space Cooperation To Continue"]

[Text] Paris—The Franco-Russian space cooperation program, which after 29 years "remains intensive," includes flights of cosmonauts to the Mir space station, the exploration of Mars, microgravity, astrophysics, as well as remote sensing, which has just been added, said Mr. Philippe Guerit, assistant manager for "international and industrial environment," at the CNES [National Space Studies Center] directorate, on 23 December.

Summarizing the 29th series of Franco-Russian meetings held in Moscow from 16-19 December, Mr. Guerit emphasized that the RKA [Russian Space Agency] had taken over "all the rights and all the obligations of the USSR." "Created last February," the French space agency official added, "today it is respected by everyone, including the Russian Academy of Sciences."

"Under Mr. Yuri Koptiev's direction," said Mr. Guerit, "the agency has gained self-confidence and has prepared a structured program that is now being submitted to the government to obtain financing. We consider the RKA a solid counterpart in which we believe." In this regard, Mr. Guerit cites Mr. Koptiev's reaffirmation that the Franco-Russian Mars-94-96 program "is a priority project" and that he "has at his disposal the necessary budget to carry it to completion." "This is the major program the RKA needs in order to establish itself on the international scene."

The first launching in October 1994, with arrival due nine months later, will study potential landing sites. The

second, two years later, will also be part of the international Mars exploration program, in preparation for next century's manned flights. Other Franco-Russian missions, with vehicles capable of greater range, are not expected before 2000 or 2003.

With regard to manned flights, the CNES, RKA, and the NPO Energiya consortium expect to sign specific agreements in January, covering the first two missions in 1993 and 1996, and confirming last July's framework agreement providing for four flights by French cosmonauts between now and the year 2000 aboard the Russian Mir-1 or Mir-2 space stations. Jean Pierre Haignere is due to leave Baikonur around the beginning of next July, to spend 21 days aboard the Mir-1.

Also scheduled for 1993 is Interball, the first mission centered on studies of Sun-Earth relationships, with the launching of a Prognos satellite carrying French equipment for the study of the magnetospheric tail. The second is scheduled for 1994 and will examine the "lobes" at the level of the poles. The Granat satellite, with the French telescope Sigma aboard, will continue its exploration of the source of gamma rays, for another six to eight months.

The first of three Meteor satellites will be launched as part of the world climatic research program this fall, under the Scarab program, which is to continue until 1998 using the European Envisat platform. The two others will follow at 18-month intervals, the purpose of the series being to study the results of terrestrial radiations.

The French experiment Alissa, designed to study the cloud systems with the aid of a lidar aboard Mir, is being integrated into the Priroda module. Its launching is targeted for 1995. The Russian cosmonauts who will use it will have to be trained between now and then. The Russians and French are preparing to orbit the Gezon germanium-manufacturing experiment aboard a Photon in the fall of 1993.

The CNES and RKA have also launched the idea of close cooperation in the field of earth observation, centering their joint efforts on avoiding duplications, researching complementarities, and developing a common standard for the processing of the data.

Mr. Guerit pointed out that the two agencies also support possible industrial cooperation in the rockets sector, with the idea of "increasing the visibility of present systems to determine whether, by means of exchanges and joint ventures, more intelligent solutions can be developed than those being used today in the space transport domain."

In the same vein, to avoid the brain drain from Russia—to the United States in particular—the CNES, with financial backing provided by the Ministry of Research and Space, is preparing procedures and fellowships to

bring Russian researchers, engineers, and technicians, and their families to Toulouse for extended stays in France.

In addition, on 23-24 December, in Moscow, the CIS [Commonwealth of Independent States] Interstate Space Council, whose membership includes Armenia, Byelorussia, Kazakhstan, Kirghizia, Russia, Uzbekistan, and Ukraine, examined "A Program of Space Study and Utilization for 1993." ITAR-TASS has provided no details on the content of the program submitted to this Council, whose meetings are rare.

#### **Franco-Russian Accord in Isotope Separation R&D**

*93WS0241B Paris AFP SCIENCES in French  
21 Jan 93 pp 12, 13*

[Unsigned article: "Isotope Separation Accord Between CEA and the Kurchatov Institute"]

[Text] Paris—CEA and the Molecular Physics Institute at the Kurchatov Center in Moscow have decided to pool their "talents" in the separation of stable isotopes by ionic cyclotron resonance, according to a CEA announcement made on 19 January.

This four-year accord which also provides for possible common R&D studies has just been signed by the two organizations. According to CEA, "it should be eventually followed by the implementation and operation of an industrial-scale isotope separation unit, to be established in Moscow with participation from French enterprises."

Ionic cyclotron resonance is an electromagnetic separation process (using hyperfrequencies) which was perfected and improved at CEA for industrial production of stable isotopes of various metals used in nuclear physics (in detectors and in structural studies of heavy nuclei) as well as in medicine and biology (for research and diagnoses).

This accord is in keeping with the general scientific and technological cooperation agreement for peaceful uses of nuclear energy, signed in 1990 by CEA and the Nuclear Energy Ministry of the former USSR, followed in 1991 by the signing of a convention.

#### **Germany: Eurocopter Signs Cooperation Agreement With CIS Firms**

*93MI0282 Bonn DIE WELT in German 21 Jan 93 p 13*

[Text] Franco-German aviation company Eurocopter has signed an agreement with three Russian companies to develop and market the 14-tonne, 30-seat M 138 helicopter, which is scheduled to enter service in 1999. Eurocopter will invest around 180 million German marks [DM] in the project. Total development costs will be DM3.5 to 5 billion. The Russian partners are taking on the major share, with development work taking place at the Moscow military helicopter factories.

Western experts no longer doubt the ability of the Russian engineers to develop innovative aircraft with

their own know-how, but there are still many unknown factors as regards quality control, maintenance, and spares procurement for an East/West European aircraft that will subsequently be sold to Third World customers.

At the same time, there are no doubts about the economic sense of stepping up collaboration between Europe and Russia in aircraft construction. Since the Russian military budget was cut by two-thirds in 1992, experts estimate that Russian aircraft companies need replacement business alone worth a minimum of DM300 million per annum to avert financial collapse.

For his part, Louis Gallois, chief executive of the French company Aerospatiale, which holds a 70-percent controlling stake in Eurocopter (German Aerospace holds the remainder), says that the need to integrate as many Russian armaments companies as possible into partnerships with western European industries must be borne in mind. Otherwise, starving eastern firms would practise "brutal dumping on world markets."

According to Bigay, Eurocopter could show a profit for 1992. On the other hand, sales were predicted to fall to around DM3.8 billion, compared with the DM4.2 billion achieved on a comparable structural basis in 1991.

#### **Eastern European Researchers Access EC Science Network**

*93BR0385 Amsterdam COMPUTABLE in Dutch  
15 Jan 93 p 3*

[Article: "Unisource Links X.25, IP Networks"]

[Text] The Hague—Within the next six months, research networks linking scientists in Central Europe will be connected to the European Multiprotocol Backbone (EMPB) Service. Previously, western science networks were linked within the scope of the COSINE [Cooperation for Open Systems Interconnection Networking in Europe] project. Now they are going to have to pay for the connection, whereas central European scientists can take advantage of an incentive scheme run by the EC.

The EMPB Service is the commercial fruit of the International X.25 Infrastructure (IXI) network, which has been built up since 1990, when the European Commission assigned the PTT Nederland (Dutch national telephone and telecommunications company) to conduct a pilot project linking the networks of European research institutions. The project ended last October. The RARE [Associated Networks for European Research] organization is responsible for the project and assigned PTT Nederland to begin commercially operating the "network of networks." PTT Nederland, in turn, subcontracted this assignment to its networking subsidiary Unisource.

Money has now been released from other EC funds to link up central European researchers to the EMPB Service as well. Over the next six months, the following scientific networks will be connected: Hungary (January), Czech Republic (February), Poland (March), Romania (April), and Bulgaria (May). As a result of the division of Czechoslovakia, it remains unclear when Slovak scientists will be able to link their networks.

The EMPB Service supports both the X.25 and the IP [Internet Protocol] protocols. Between them, these two formats cover most European scientific networks. The European Commission and RARE predicted that opting for a single protocol would not stimulate international network exchanges between scientists. EMPB has become the bridge between the two camps.

The EC has launched the development of the EMPB Service because European scientific networks are lagging far behind their American equivalents. "Speeds of 34 Mb are quite normal over there," claims Kamps. The EMPB Service is rather modest in comparison. Its maximum speed at the moment is 2 Mb. The English "Janet" and the German "Win" research networks also have a 2-Mb connection.

Kamps expects that Spain, Italy, Belgium, the Netherlands, and Switzerland (CERN [European Organization for Nuclear Research]) will all soon opt for the 2-Mb connection.

## EUROPE-ASIA RELATIONS

### French Firms' Business Difficulties in China Analyzed

93WS0210C Paris L'USINE NOUVELLE in French  
10 Dec 92 pp 48, 49

[Article by Jacqueline Mattei: "The Long March of French Manufacturers in China"; first paragraph is L'USINE NOUVELLE introduction]

[Text] Political ups and downs are trivial when big contracts are negotiated for 10-year periods and the country's GNP growth was 12 percent in 1992. But France is still only a small partner of the People's Republic.

Will Taiwan's order of 60 Mirage 2000-5s and 1,500 missiles throw a damper on France's timid advances in China? The fabulous Fr20 billion contract has drawn heavy fire even before its official ratification. The United States is pressuring the Taiwan government to block the deal. China is threatening to freeze its French purchases in retaliation.

But is the threat a serious one? The Americans' sale of 150 F-16 fighters to Taiwan did not prevent them from supplying China with a television satellite and 2 million tons of wheat, point out the most optimistic observers. But France—which accounts for barely 2.5 percent of China's imports—does not have the clout of the United

States, which is China's third-biggest trading partner after Hong Kong and Japan.

During a stopover in Peking, the president of the France-China Committee Francois de Villepin seems to have gotten assurances from some of the officials with whom he spoke that contracts already signed would not be challenged. On the other hand, big projects under negotiation may be jeopardized.

One symbol of the chilly relations between the two countries is the cold shoulder given by Chinese officials to the A340's stop in Peking during its precertification test tour. True, China Eastern has already placed firm orders (with down-payments) for five A340s with Airbus Industrie, but observers say that prospects for others are dwindling. "We are confident and untroubled," reply Airbus Industrie officials.

GEC-Alsthom, which is negotiating for the construction of the Canton subway, is in a wait-and-see mode. But Framatome makes no bones about its distress: While winding up construction of the Daya Bay nuclear plant near Canton, the French firm is getting ready to negotiate a contract to supply two other 900 MW sections in Yang-Jiang near Macao. The contract is equivalent in value to that of the 60 Mirages.

"How can the French government slam shut in our faces the only market that is now booming?" exclaims Jean-Claude Leny, Framatome's CEO. The Chinese market, which is beginning to take off in earnest, is very attractive to western manufacturers confronted with the general stagnation of their own economies.

The country's gradual reform of its economic system and its open door policy toward foreign capital has enabled 800 million Chinese to boost their consumption—even if 100 million more still live below the poverty line.

### The United States and Japan On the Lookout

In 15 years, China has doubled its production of eggs and tripled its production of poultry; household appliances have started to appear in urban homes. The country's GNP has been growing at a rate of 9 percent annually for the last several years, and should even reach 12 percent this year. The growth rate of industrial production is 20 percent, that of trade 25 percent. The United States is keeping a sharp eye on these new market outlets, as is Japan: Japanese exports to China have shot up 78 percent since the beginning of the year. Peking is beginning to outstrip Seoul as Japan's top customer.

France, China's eighth-ranking supplier, has not benefited much from the trend. During the first nine months of 1992, our exports to China—essentially equipment—declined 4 percent, while our imports (textiles, agricultural products, leather and skins, but also electrical gadgets) continue to rise. The result is a trade deficit of Fr8.9 billion.



In China as elsewhere in the world, a few big French manufacturers—always the same ones—are extremely active, respond to bid invitations, and invest in country. They are often successful: Peugeot's joint venture in Canton is racking up sales of Fr2.2 billion and has become China's top exporter of cars.

A tiny number of small and medium-size businesses benefit from the ripple effect. The contract won by Pechiney for the Pinggao aluminum project had a few positive repercussions. Today, suppliers of automobile equipment also hope to benefit from Peugeot's, and now Citroen's, plants. Rarer still are small firms that strike out on their own. But France Ebauches, which created a joint venture in 1990, wants to expand its business whatever happens.

The crackdown on the Tienanmen Square demonstrations—and the French government's official censure of it—had already chilled relations between Paris and Peking. They have since improved. In early 1992, French manufacturers scored a few successes. Air Liquide was put in charge of engineering an oxygen- and nitrogen-producing plant near Xian, in Shanxi province. GEC-Alsthom won a series of contracts (a firm order for two sections of the Shajiao coal plant and a letter of intentions for a third), which confirm its position as China's top supplier of electrical power plants.

Elf-Aquitaine signed a skeleton agreement last year, and is negotiating a refinery/distribution project worth several billion French francs. Rhone-Poulenc signed a protocol accord that provides for 15 projects, five of which are at an advanced stage.

Are relations between France and China about to deteriorate again? In fact, there have been few threats against medium-size projects, especially as provinces are free to decide about investments of up to Fr100, or even Fr150, million. In the country's fourth-largest city, Shenyang (3.2 million inhabitants), Lyonnaise-Dumez has just won the concession to distribute water for 40 years.

"We have many projects in the works, but none that are spectacular. All our negotiations are progressing as expected," says Pierre Laguerre, Rhone-Poulenc's director of international affairs. It is the biggest contracts, such as the Canton subway or nuclear plants, that are threatened. Especially projects slated to be financed by state-to-state protocols. No such protocols were signed in 1992.

It is up to French manufacturers to invent a line of defense—and to patiently endure their hardship. In China, negotiations for big projects can last 10 years. Between now and then, relations between Paris and Peking have time to brighten.

### Taiwan's R&D Programs Modeled on German, US Counterparts

93WS0223A Duesseldorf VDI NACHRICHTEN  
in German 4 Dec 92 p 17

[Text]

### Taiwan Increases Spending for Research and Development

#### A Little Tiger Wants to Grow Up

#### German Funding Concept Combined With Elements of the American System

In the 1980s, cheap mass-produced products gave Taiwan a double-digit growth rate. An increase in spending for research and development should now help "Made in Taiwan" become a symbol of quality. The German model was behind government support of research.

As darkness falls, "Snake Alley" comes to life. There is little which can't be had at the evening market in Taipei's Wanhua district. The blood of freshly skinned snakes mixed with a dash of bile is still considered to be a tried and true preparation for increasing virility and gave the market its name. Between stands with textiles, jewelry, or every imaginable kind of food, a young Chinese man has spread out his collection of watches on the ground. Rolex, Gucci or Chanel—the equivalent of 20 German marks [DM] a piece.

Of course they are not genuine—in Taiwan, the "expert" on Southeast Asia will say, nothing unusual. The "beautiful island"—this is the meaning of its Portuguese name "Ilha Formosa"—has been considered as the stronghold of brand-name piracy for decades, the words "copyright" or "protected goods" seem to be foreign to the Chinese; those looking for quality don't exactly reach for products "Made in Taiwan."

Government economic planners want to change that. Because of tremendously increased wages, the island state is no longer a cheap producer in any case. Of course, it's clear to those in charge that a change in image from cheap mass-produced goods to high-tech products doesn't come about by itself. Therefore the government is counting on resources which are available even to countries without natural mineral wealth in order to make it to the top in the global economy: education, research, and development.

On Taiwan there are presently 21 universities, 20 colleges, and 75 junior colleges with about half a million students. About 40,000 students graduate annually—30 percent of them in engineering. Spending for research and development (R&D) is increasing steadily. During the economic boom in the 1980s, which gave the country double-digit growth rates and a firm place among the "little tigers" of Southeast Asia, this area was criminally neglected. Less than 1 percent of the gross national product was spent for it altogether in 1985. Even the

"competitive tiger" South Korea invested almost double that amount, the established industrial countries spend about three times as much.

Since then, the share of the gross national product for R&D has risen to 2.2 percent, strictly according to plan. Above all, government support contributes to this—embedded in a system which seems strangely familiar to the German visitor. "We have combined Germany's research support system with some elements of the American system," says Richard Chang of the National Science Council (NSC), confirming this impression.

Thus there are counterparts to the German Research Society (DFG), the Max Planck and Fraunhofer Societies, as well as to our national laboratories. Along with this, application-oriented and industry-related research are supported to a degree that would be unthinkable with us.

The National Science Council is at the hub of government research support. Its central area of responsibility is basic research at the universities—a counterpart to the German Research Society (DFG). The similarities extend to the funding process and advisory role. The greatest difference from the DFG is probably that the NSC enjoys annual growth rates of 20 percent, while the DFG budget scarcely keeps pace with the inflation rate.

The "DFG role" is, of course, only one task of the NSC. In addition, it is also concerned with applied research up to the point of patent-ready development. University professors are not the only ones given the opportunity to work for a while in an industrial firm.

Above all, the NSC runs the "Science Based Industrial Park" in Hsinchu—a pearl of research support which the government is especially proud of. An hour's drive southwest of the capital of Taipei, research centers from industry and two universities are brought together on almost 2000 hectares. The government has pumped \$2.5 billion into this Taiwanese "Silicon Valley" since the early 1980s. Of the 135 firms with over 23,000 employees which have since located in Hsinchu, 43 are in the area of microelectronics. The government generously supports the firms' research projects and awards highly remunerative prizes for new developments annually.

The "Industrial Technology Research Institute" (ITRI), which, by no accident, maintains good relations with the Fraunhofer Society, is also located on the grounds of the science park in Hsinchu. Both funding sources are close to government and industry. The basic financing of the 11 institutes comes from the government. "With government money, we pursue primarily long-term projects, the results of which are then made available to Taiwan's industry," explains Angela Huang.

Industry itself can award development contracts to an ITRI institute. Such contract research accounts for 40 percent of the total ITRI budget. And by no means does it involve only computers. The carbon-fiber bicycle frame from the bicycle manufacturer Giant, first introduced by the firm to the world market, was developed in

an ITRI institute. And tennis racquets of the same material from the Kennex company, which make the hearts of tennis players leap with joy, actually come from ITRI. A new closing mechanism for umbrellas, a two-cycle motor scooter optimized for consumer and waste gas, and a new synthetic fiber with "soft-as-silk" properties also left one of the ITRI institutes, in which about 3,500 scientists work, crowned with patents.

From chemistry to materials science, from optoelectronics to energy research, everything that Taiwanese industry could use is represented. There is even a center for aerospace engineering at ITRI. Taiwan's space technology has set itself an ambitious goal. Its own research and environmental satellite is to be launched with an American space shuttle in this decade. A national laboratory is working on it together with the ITRI space institute.

Two additional "national laboratories" are also at work already: one is operating a storage ring for synchrotron research, the other is devoting itself to earthquake prediction—Taiwan lies in one of the world's most tectonically active areas.

Four additional "national laboratories" are in the planning stage. Along with these research establishments, the Academia Sinica also maintains its own research institutes; from the viewpoint of financial and organizational structure, the Chinese academy is a counterpart of the German Max Planck Society. Wu Tayou, president of the academy, recently visited his "sister organization" on the Chinese mainland. While on official political levels the claim to sole representation of both Chinese states is emphasized loudly again and again, everyday affairs have long been characterized by pragmatism. Just as in joint ventures between business enterprises of the two countries, scientists, too, are to cooperate more in the future. "Our anticommunism doesn't prevent us from securing the services of very talented scientists on the mainland," says the commentator of Taipei's "China Post," getting to the heart of the matter on the occasion of Wu's visit.

The rigorous support of research and development seems to pay off. "In the latest Science Citation Index, Taiwan appears in 26th place—in 1985 it was 37th," the president of the National Science Council, Han-Min Hsia, reports proudly, and the first Taiwanese brands are also sounding good. For the time being, however, watches are not among them. Gucci, Rolex & Co. have to fear cheap imitations, but not stiff competition, from Taiwan for now.

#### **Italy's Alenia Assigned Radar Contracts in China**

*93MI0309 Milan ITALIA OGGI in Italian  
2 Feb 93 p 12*

[Text] Two new contracts in China for Alenia (an IRI [Institute for the Reconstruction of Industry]-Finmeccanica group company)—which has been assigned an order for the installation of a primary radar at Shenzhen airport and a complete radar system at Wuhan airport in the Hubei region. The first contract is valued at \$2.4 million (approximately 3 billion lire) and

the second is valued in yen since it has been funded in part by Japan and is worth approximately 7 billion lire. Shenzhen airport is destined to become one of the most important and busiest airports in the country because it will serve the Shenzhen special economic zone which is the most modern and advanced in China. The primary radar, which explores the airspace to identify aircraft in flight, will complement the secondary radar already installed there by Alenia. The Wuhan airport contract includes a complete system for route control and for takeoff and landing, the flight management system, and the communications and personnel training systems. The systems will be installed by June.

### Belgian-Japanese Biotechnology Venture Successful

93BR0384 Zellik *BELGIAN BUSINESS & INDUSTRIE* in Dutch Feb 93 pp 78-79

[Article by Karel Buntinx: "Eurogenetics: Biotech Success"]

[Text] Eurogenetics has investment plans worth 1 billion Belgian francs [BFR]. A triumph at last for biotechnology. Only a few of the many biotechnology ventures that mushroomed in the mid-eighties have managed to survive—let alone become profitable. Eurogenetics, however, has seen unprecedented growth over the last four years, with sales rising from BFR137 million in 1988 to more than BFR1 billion in 1992.

When asked the secret of the company's success, Deputy Manager Eddy Smets said: "Eurogenetics is not just a scientific company, but it also has a sound commercial policy, thanks to close cooperation between our R&D, marketing, and service departments."

Eurogenetics maintains close ties with various Belgian and foreign universities and has a whole network of foreign commercial contacts. Furthermore, subsidiaries have already been set up in France, Germany, Italy, the Netherlands, and Switzerland.

"What we are doing is really very simple," says Eddy Smets. "A number of animals are infected at the universities. They respond by producing antibodies, which are protective elements. We extract these and bond them to non-malignant cancer cells so that they can really reproduce endlessly. Next, we add a colored tracer, such as fluor, and use it to cover the bottom of a test tube. If we then pour in a patient's blood, the antibodies react to any morbid germs, such as AIDS, hepatitis, rubella, syphilis, etc. With the help of the light spectrum, the colored tracer can be used to measure how many viruses are present in the blood. In this way, we are continually trying to develop new tests for detecting infectious disorders, types of rheumatism, hormonal deviations (thyroid glands, pregnancy), and tumorous elements (cancers). Thus, our products are mainly intended for clinical laboratories that purchase ready-to-use kits from us. These kits contain both the substances and the instruments needed to conduct several tests. At present, 36 of our test kits are being marketed.

### Japanese Partner

In 1986 the Japanese petrochemical multinational, Tosoh, acquired a 50-percent share in Eurogenetics, enabling the company to distribute a number of new products. Tosoh is a noncommercially structured manufacturer in the human diagnostics sector. Eddy Smets: "Our intensive cooperation does not stop with distribution. Eurogenetics' strong scientific background makes it an ideal partner for developing substances that can be adapted to the instruments produced by Tosoh. Already this has resulted in the extensive automation of clinical laboratories and a whole range of new products. In return, Tosoh is now going to sell our products in Asia and America. They supply the test equipment and we provide the products, i.e., the test tubes."

Eurogenetics now also intends to tap into a new segment of the market. Tosoh actually makes the same products as Eurogenetics, but the Japanese concentrate on the more industrialized and automated customers. Moreover, they do not merely supply them with test products, but also provide the instruments required to use them—in one and the same kit. Eddy Smets explains: "Over the last one and one-half years, we have been conducting a pilot study aimed at producing such kits, but especially targeted at smaller companies. Admittedly, the new product will generate internal competition, but it should also ensure that smaller companies that expand of their own accord come to Tosoh for their larger kits."

### Money

Over the next three years, the existing building will be enlarged by 50 percent and 20 new jobs for highly qualified individuals will be created. "However, it is difficult to keep providing a solid Flemish financial base," said Eddy Smets, "despite our results. In 1991, 95 percent profit; in 1992, 25 percent profit after switching the sales system to a kind of leasing arrangement. Our forecast for 1993 is 45 percent profit. So if we go public, the investors will be raring to go. But our product is evidently too alien for financiers. If we made chocolate and presented such figures, then they would be queuing up to invest in us. But okay, things are starting to change, partly due to IWT (Flemish Institute for the Promotion of Scientific and Technical Research in Industry). Talks are underway for prototype backing."

[Box, p 79]

### Investments

During 1992, Eurogenetics doubled its existing facilities, adding another 800 square meters. That development marked the end of the first expansion phase, which aimed at modernizing production and extending the company's R&D capacity. On 1 November 1992, Eurogenetics opened up a Service and Education Center in

the science park on the university campus in Diepenbeek. The objectives there are, first, to continue developing the company's own instruments in the local incubation center and, second, to train clients in the electronics and biochemistry applied there.

Construction work is going on in Tessenderlo, too. Three months ago, Eurogenetics purchased another plot of land measuring 3,800 square meters behind the existing building. In the meantime, negotiations have already begun for the acquisition of yet more land for construction.

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